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The effects of individual and social factors on children's perceptions and suggestibility

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Abstract

The four main empirical studies reported in this thesis investigated the effects of interviewer behaviour and children's anxiety on children's perceptions and memory accuracy and suggestibility. The first and third studies explored how different interviewer nonverbal and verbal behaviours were being perceived by children. In these studies, eight- to ten-years-old watched video clips of an interviewer displaying combinations of nonverbal and verbal behaviours defined in the literature as 'supportive' (e.g., smiling, positive verbal reinforcement) and 'non-supportive' (e.g., closed body posture, verbal coercions), and were asked to rate the interviewer on six attributes (e.g., friendliness, strictness). The results from these studies demonstrated that smiling and positive reinforcements received high ratings on the positive attributes (i.e., friendly, sincere, and helpful) and fidgeting and negative reinforcements on the negative attributes (i.e., strict, bored, and stress). The second and fourth studies then examined the effects that these interviewer behaviours had on children's memory accuracy and suggestibility in investigative interviews. Eight- to ten-year-old children participated in a learning activity about the vocal chords. One week later, they were interviewed about the activity by an interviewer adopting either the supportive nonverbal or verbal behaviour or the non-supportive one. This showed that children interviewed by the non-supportive interviewers were less accurate, more suggestible, more likely to falsely report having been touched during the activity, less likely to say that they did not know an answer, and reported feeling more anxious due to the interviewing than those interviewed by the supportive interviewer. Finally, overall, children gave more correct answers to questions about central, as opposed to peripheral, details of the activity. The discussion of the empirical research is then followed by some concluding comments.

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Declaration

Whilst registered as a candidate for the above degree, I have not been registered for any other research award. The results and conclusions embodied in this thesis are the work of the named candidate and have not been submitted for any other academic award.

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Publications

The work in this thesis followed on from my MSc in Psychological Research Methods. These findings were published as:

- Almerigogna, J., Ost, J., Bull, R., & Akehurst, L. (2007). A state of high anxiety: How non-supportive interviewers can increase the suggestibility of child witnesses. *Applied Cognitive Psychology*, 21(7), 963-974. (see Appendix E)

The studies reported in chapters 3 and 4 have been published as:

- Almerigogna, J., Ost, J., Akehurst, L., & Fluck, M. (2008). How interviewer's nonverbal behaviors influence children's perceptions and suggestibility. *Journal of Experimental Child Psychology*, 100(1), 17-39. (see Appendix F)

The studies reported in chapters 5 and 6 have been combined into one manuscript that has been submitted to Law and Human Behavior as:

- Almerigogna, J., Ost, J., Akehurst, L., & Fluck, M. (under review). Interviewer's verbal behaviours and children's perceptions and suggestibility.

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- Almerigogna, J. (in preparation). Vérification de la structure factorielle d'une traduction française de l'Inventaire de l'Anxiété État-Trait pour Enfants.

The findings reported in the present thesis have also been presented at national and international conferences:

Presentations

- Almerigogna, J., Ost, J., Akehurst, L., & Fluck, M. (2007). Interviewer's verbal behaviours and children's suggestibility. *Paper presented at the 7th Meeting of the Society for Applied Research in Memory and Cognition (SARMAC), 25-29 July 2007, Lewiston, MA, USA.*
- Almerigogna, J., Ost, J., Akehurst, L., & Fluck, M. (2006). The influence of interviewer's nonverbal behaviours on children's perceptions and suggestibility. *Paper presented at the 2nd International Conference on Investigative Interviewing (III), 3-7 July 2006, Portsmouth, England.*
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- Almerigogna, J. (2006). The influence of interviewer's nonverbal behaviours on children's perceptions and suggestibility. *Paper presented at a Seminar of the International Centre for Research in Forensic Psychology (ICRFP), 30 June 2006, Portsmouth, England.*
- Almerigogna, J. (2004). Interviewing styles and anxiety in children's suggestibility. *Paper presented at a University of Portsmouth Departmental Research Seminar, 9 June 2004, Portsmouth, England.*

Posters

- Almerigogna, J., Ost, J., Akehurst, L., & Fluck, M. (2005). How do children perceive different non-verbal behaviours from interviewers? *Poster presented at the 15th Conference of the European Association of Psychology and Law (EAPL), 29 June-2 July 2005, Vilnius, Lithuania.*
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Summary of thesis

It is now well established in forensic psychology that children's eyewitness testimonies may be influenced by a variety of factors. The present work investigates two such factors pertinent to child witnesses' reports, namely, interviewer behaviour and children's anxiety. The first chapter introduces the issues at play when interviewing child witnesses with a focus on memory, suggestibility and on the cognitive, individual and social factors influencing these processes. It also presents a review of social support and anxiety in eyewitness research. The second chapter introduces the methodological issues raised by the present research and presents the contributions and aims of the studies. It also presents the studies carried out to design the interview questions and to verify the factor structure of a French translation of the State-Trait Anxiety Inventory for Children (Spielberger, Edwards, Lushene, Montuori, & Platzek, 1973) that was used in the experiments reported in this thesis. The next chapters comprise the empirical studies. The first and third studies explored how different interviewer nonverbal and verbal behaviours were perceived by children. The second and fourth studies examined the effects that these interviewer behaviours had on children's memory accuracy, suggestibility and anxiety levels in investigative interviews. The discussion of the empirical research is then followed by concluding comments.

CHAPTER 1: INTERVIEWING CHILD WITNESSES

Memory

Historically, child witnesses have not been admitted to testify in courts on grounds of their perceived lack of competence. They were thought to be incapable of encoding information from an event and of subsequently retelling the story with enough accuracy and maturity to be credible under the scrutiny of judges and juries (Brainerd & Ornstein, 1991). Today, children's memory, akin to adults, is viewed as both fragile and dynamic. It is well established that memory does not act as a 'mental video-recorder', accurately storing details which can be replayed at a later date (Roediger, 1993). Rather, because of its constructive nature, a child's recollection (like an adult's) may be incomplete or even inaccurate due to interference occurring at any of the stages of memory (Baddeley, 1997). These stages will now be outlined.

Encoding

Encoding is the process by which an event is recorded in memory. Due to limited attentional resources, it is not possible for an adult or a child to attend to every aspect and detail of an event. Logically, details which have not been attended to during the original occurrence cannot subsequently be recalled (Baddeley, 1997). In addition, the encoding of an event may be influenced by many different factors. For example, a detail with personal importance has more chance of being attended to and thus encoded than one without such significance (Christianson, 1992). Under such circumstances, children's memories can be reliable and accurate (Pipe & Salmon, 2002). Kail (1989) also noted that children's memorial capacities, like adults', were limited when trying to recall peripheral details, as opposed to more

central or 'core' details, even over a short period of time. Similarly, a detail presented several times is also more likely to be encoded than one not repeated (Henson, 1998).

Storage

Once encoded a memory gets stored. However, information does not simply remain in storage passively until needed; it can get lost. For example, time is known to greatly affect stored information (Estes, 1997). The longer a memory stays in storage untouched, the greater chance it has of disappearing (Loftus & Loftus, 1980). Furthermore, children appear to forget at a faster rate than adults, increasing the possibility of misremembering an event (Poole & White, 1993).

Retrieval

The final phase of memory is retrieval. It encompasses all the means by which one attempts to access encoded memories in storage. Retrieval is dependent on at least three factors: (i) whether the information was encoded in the first place; (ii) whether it has been properly stored; and (iii) whether it can be accessible at the desired retrieving time. One known way to facilitate access to, and retrieval of, memories is called the *encoding specificity principle* (Wiseman & Tulving, 1976). This theory argues that memories are better recalled when the context of retrieval matches the context of encoding (Tulving & Thomson, 1973). For example, it has been shown that reinstating at retrieval the conditions and environment present at encoding increases the amount of accurate information recalled (Malpass, 1996). This property of memory has furthermore been integrated as one of the techniques used in the Cognitive Interview (Fisher & Geiselman, 1992), an interviewing method known to facilitate retrieval by increasing the quantity and quality of information

reported. During context reinstatement, interviewees are asked to mentally recreate the physical and personal context present at the time of the encoding of the event.

Because children's eyewitness reports may be influenced by many different factors at any of the stages of memory (i.e., encoding, storage or retrieval), inaccuracies are to be expected when recalling events (Howe, 2000). Perhaps the most significant factor influencing memory is post-event information (PEI). Indeed, many researchers have now demonstrated that PEI can have dramatic effects on the accuracy of both children's and adults' memories. PEI may come from a range of different sources, for example, an interviewer, a discussion with another person, newspaper article or television coverage. Some of these sources of PEI may have more impact than others because they are more credible (Loftus, 1996). The extent to which individuals are susceptible to PEI is referred to as suggestibility. This concept will now be introduced.

Suggestibility

Over the last decades, an increasing number of studies have examined the extent to which the accuracy of children's memories can be affected by suggestion. To study suggestibility, researchers have typically used the same paradigm. Namely, participants are presented with an event or story after which they receive post-event information. Half of the participants are presented with neutral information and half are exposed to misleading information. Finally, participants' memories for the original event are tested to evaluate any differences between the two groups and to determine the extent to which the suggested information changed, if at all, the recollection of the misled group. In general, such studies have shown that people

given inconsistent post-event information are more likely to misremember the original incident than those presented with unbiased information (Loftus, 1996). This effect of suggestibility on memory, referred to as the 'misinformation effect', has been explained with at least three cognitive models: (i) alteration; (ii) coexistence; and (iii) source-monitoring. These will now briefly be explained.

Alteration

The alteration model states that suggestions completely alter the memory for the original event (Loftus, 1996). When new relevant information is presented, it is incorporated into the previously stored memory. However, when this new information is in some way inconsistent with the initial memory, the former may overwrite or even destroy the latter. This alteration process is believed to be automatic and irreversible (Greene, Flynn, & Loftus, 1982). The implication is that, as initial memories have been altered, they can never be recovered (but see Blank, 1998, for a challenge to this claim).

Coexistence

The coexistence model argues that both old and new information may coexist in memory. The introduction of a new fact creates a new memory trace that exists alongside the old one, which remains intact (Bekerian & Bowers, 1983). At retrieval, misinformation is accessed more quickly and easily possibly because it is more recent and more salient than the original information (Pirulli & Mitterer, 1984). The suggested information therefore interferes with the retrieval of the initial memory. People who have not been presented with suggestions experience no interference at retrieval and therefore may access the initial memory more directly (Christiaansen & Ochalek, 1983).

Source-monitoring

The source-monitoring theory argues that suggestibility occurs when people incorrectly identify the source of the misleading detail as belonging to the original incident (Lindsay & Johnson, 1989). According to this model, because misled participants store separate traces for the original and for suggested information (Lindsay, 1990), at retrieval, they have simultaneous access to both representations but have difficulty deciding which one came from the original event (Belli, Lindsay, Gales, & McCarthy, 1994). Thus, according to this model, misled participants are, in fact, making a source misattribution error.

As noted by these models, suggestibility may be the result of different cognitive processes. However, not all explanations of the misinformation effect point to memory impairment. Self-presentational or social factors may also be important contributors to suggestibility (Bless, Strack, & Walther, 2001). Eyewitnesses may decide, consciously or not, to use the presented suggestions to fill in gaps in their memory as they might simply not have encoded these details from the original event (Brainerd, Reyna, Howe, & Kingma, 1990). They may also decide to go along and agree with whatever the interviewers are saying in order to please them even though they might actually remember the original event (McCloskey & Zaragoza, 1985). This tendency to comply with the interviewer has been investigated with Gudjonsson's work on the Interrogative Suggestibility Scale (ISS). This showed that people may tend to yield to interviewer's questions and to change their answers if told that some of them may be wrong (Gudjonsson, 1984). These tendencies to yield and shift can also be affected by a range of different factors, such as intelligence (Henry & Gudjonsson, 2003) and anxiety (Gudjonsson, Rutter, &

Clare, 1995). Suggestibility may therefore be influenced by a range of cognitive, individual, and social factors (Gordon, Baker-Ward, & Ornstein, 2001). Some of these factors will now be discussed.

Cognitive Factors

Before children testify in court, they must demonstrate that they possess the necessary cognitive capacities, such as proper language and understanding skills, to be competent witnesses. However, studies have shown that children are less likely than adults to instinctively use memory strategies such as mental rehearsal, and when they do, they are less competent than adults, partly because it may use too many of their cognitive resources (Miller & Seier, 1994). These frailties may be due to children's memory not being completely developed and controlled (Goodman & Reed, 1986). Nonetheless, these memory capacities improve with age and cognitive sophistication as children learn to use more effective and deliberate strategies for remembering (Ceci, 1996). Although no cognitive factors are specifically studied in the present thesis, as their influence remain important for children's memory and suggestibility, some of them are summarised below.

Truth and lies

While it used to be thought that children were cognitively incapable of telling lies, it is now recognised that they may sometimes consciously deform the truth in order to mislead or deceive interviewers (Leekam, 1992). Children's motives to lie may be either personal (e.g., to avoid a punishment or to gain a reward) or social (e.g., to keep a promise or to protect a loved one) (Ceci, DeSimone, Putnick, Lee, & Toglia, 1990). Moreover, Lewis, Stanger, and Sullivan (1989) demonstrated that children appear able to lie as early as three years of age. They are

also capable of maintaining lies over time (Quas, Davis, Goodman, & Myers, 2007). There is no evidence, however, that children are any more or less inclined to lie than adults and intentional fabrication remains rare (Lewis, 1993).

Knowledge

Prior knowledge may influence how children understand and remember an event (Ornstein, Shapiro, Clubb, Follmer, & Baker-Ward, 1997). For example, Goodman, Quas, Batterman-Faunce, Riddlesburger, and Kuhn (1994) showed that children with a prior knowledge of a stressful medical procedure subsequently demonstrated better recall than children without such knowledge. Leichtman and Ceci (1995) found that children were more likely to accept suggestions that were consistent with the prior knowledge they held about an event or person. On the other hand, lack of knowledge means that potentially traumatic events may not be understood as such (Saarni, 1999) or misinterpreted (Steward, O'Connor, Acredolo, & Steward, 1996) and as a result be more easily distorted (Ricci & Beal, 1998).

Children are known to be more dependent on scripts – cognitive structure representing how events should typically happen - than adults. They tend to organise their past by forming generalised event representations (Farrar & Goodman, 1992). They therefore are more likely to confuse what *actually* happened with what *usually* happens in a similar situation (Quas, Qin, Schaaf, & Goodman, 1997) and have difficulty remembering the particular elements of any given routine experience (Brewer, 1997). Furthermore, as memories fade away with time, children tend to report more and more script details to fill in the gaps rather than information from the specific event to be remembered (Ornstein *et al.*, 1997).

Language skills

Before five or six years old, children's linguistic structures are not yet fully developed. Their verbal production skills, being more limited and less descriptive than that of adults, may therefore prevent them from expressing their actual recollection and induce them to simply acquiesce to whatever information is being suggested to them (Chae & Ceci, 2005). For example, Kulkofsy, Wang, and Ceci (2008) interviewed young children about a staged event in which they participated and showed that children who provided higher quality narratives were less suggestible than those with poorer narrative skills.

Besides verbal production skills, children may also lack comprehension skills. Greenstock and Pipe (1996) stated that children have difficulties understanding the complicated words and syntax often used in courtrooms (Walker, 1999). Furthermore, Warren and McCloskey (1993) argued that children rarely ask for clarifications when they do not understand what is being required from them. Instead, they often try to answer questions they do not wholly comprehend or that are nonsensical and bizarre (Pratt, 1990). Professionals should therefore be aware that the way they ask a question to a child may greatly influence the answer they receive (Walker-Perry, McAuliff, Tam, Claycomb, Dostal, & Flanagan, 1995).

The cognitive factors described above are not constant; their effects tend to decrease with age. However, although they are probably more relevant to young children, older children are not immune to their influence (Candel, Merckelbach, & Muris, 2000). This is explained in the next section on individual factors which highlights the impact of such characteristics as age.

Individual Factors

Age

As the present work focused on eight- to ten-year-old children, the effects of age on memory are described. Age is often viewed as the most important factor influencing children's memory and suggestibility (see Ceci & Bruck, 1993 for a review). For example, Geddie, Fradin, and Beer (2000) found that age was the best predictor of children's ability to accurately report information. Indeed, research has almost consistently showed that as age increases, suggestibility tends to decrease (Candel, Merckelbach, & Muris, 2000). Children also find it more difficult to monitor the source of their recollections (Parker, 1995). Ackil and Zaragoza (1995) showed that six-year-old children were more likely to claim that they remembered originally seeing suggested details than twelve-year-old children. Such findings suggest that young children may be more prone to confuse reality and fantasy (Lindsay, 2002) and to integrate misleading information into their own recollections (Lindsay, Johnson, & Kwon, 1991). However, although young children are more susceptible to suggestions, more recent research has shown that, when questioned appropriately, they can recall information as accurately as adults (Krähenbühl & Blades, 2006). Nevertheless, age remains a good predictor of suggestibility as it encompasses many relevant areas of development (e.g., cognitive capacities, social compliance).

With the exception of age, few individual differences have been explored in relation to children's suggestibility. For example, Vrij and Bush (1998) found that children with low self-confidence incorrectly answered a substantially higher percentage of misleading questions than self-confident children. In a recent review,

Bruck and Melnyk (2004) found that such psycho-social factors as self-efficacy, maternal attachment and the parent-child relationship were the best predictors of children's suggestibility. Ridley, Clifford, and Keogh (2002) demonstrated that children with high levels of state anxiety were less prone to be misled than those with lower state anxiety levels. The effect of anxiety on memory accuracy is an important subject to study as this factor is often naturally present at both encoding and retrieval of forensic events. Anxiety, and its influence on memory, will now be discussed.

Anxiety

Anxiety is one of the most pervasive human emotions (Barlow, 2002). Therefore, the influence of anxiety on memory and suggestibility is potentially a highly relevant factor in relation to forensic interviews. For example, Gudjonsson (1988) found a positive relationship between levels of state anxiety and interrogative suggestibility. Anxiety may be even more important in relation to child witnesses. Firstly, the event for which they are testifying (whether as witness or victim) as well as the repeated police and court interviews are likely to be anxiety-inducing. Secondly, anxiety involves the interaction of vigilance, attention, perception, reasoning, and memory (Rachman, 2004); cognitive processes which are all essential to reliable and accurate testimonies. Although, there is an agreement on what anxiety is - an unpleasant emotional state or condition which is distinguished by subjective feelings of tension, apprehension and worry (Spielberger, 1972) -, many different theories have been proposed to account for its origins and causes. These can, broadly speaking, be categorised into four groups: (i) learning; (ii) psychoanalytical; (iii) neuropsychological; and (iv) cognitive theories. These will now be introduced.

Learning theories

The first learning theory of anxiety was based on Pavlov's (1941) classical conditioning processes. It stated that anxiety is mainly learned by conditioning as a response to certain stimuli (Mowrer, 1939). This learned response leads to either escape or avoidance behaviour. The theory claims that this practice of *stimulus→anxious reaction→avoidance/escape behaviour* endures because it is, at least to some extent, successful for individuals by causing them to withdraw from the source of their anxiety. The generated behavioural response thus reduces the anxiety experienced from the stimulus. Eysenck and Rachman (1965) applied the learning theory to explain the persistence of anxiety and of its response behaviour in some people. These people usually use the avoidance/escape behaviour to try to diminish their anxiety. When it is successful, the response behaviour is reinforced and the anxiety reaction is maintained (Watson & Rayner, 1920).

Psychoanalytical theory

The psychoanalytical approach argued that anxiety is mainly a reaction to a constant failure to reach sexual satisfaction. Freud (1950) also viewed anxiety as a persistent and crucial part of neuroses. He stated that unacceptable sexual impulses are repressed into the unconscious where they are converted into symbolic representations (Freud, 1949). These repressed feelings create an anxiety that will manifest itself through neurotic behaviours or dream symbols. Within this theory, anxiety is therefore a reaction of the ego to threats from the needs of its libido. The internal threat (i.e., the unacceptable sexual needs) is converted into an external one, namely, anxiety. The function of anxiety is to relieve unsatisfied sexual drives. As an example, Sperling (1971) stated that fears of spiders resulted from an unresolved problem of sexual identification such as bisexuality. Spider phobics use spiders as

symbols, that is, defence mechanisms against more threatening and shameful sexual desires. Although psychoanalysis introduced many interesting concepts such as the unconscious, most of it remains hard to test (Crews, 1995, but see Erdelyi, 2006). Furthermore, research has now established that most people suffering from anxiety do not actually have sexual problems or intolerable sexual impulses (Boring, 1991).

Neuropsychological theories

The most influential neuropsychological theory of anxiety is that of Gray (1982, 1986). His theory explained individual differences in trait anxiety and attempted to account for some of the main anxiety disorders such as generalised anxiety disorder and obsessive-compulsive anxiety. Gray (1982) observed the behavioural effects of anti-anxiety drugs and assumed that similarities in these effects were signs of impaired functioning of the system mediating anxiety, the behavioural inhibition system. This system can be triggered by four types of stimuli (i.e., punishment, non-reward, novel stimulus, and stimulus that innately produce fear) and has the consequence of increasing arousal and attention as well as inhibiting all other ongoing behaviours (Gray, 1987). For punishment and non-reward stimuli, the system seems to function similarly to the learning theory, in that anxiety acts as a response to particular stimuli and generates a reinforced behaviour of escape or avoidance. Concerning novel stimuli, Gray (1982) argued that the hippocampus operates as a comparator, comparing information about the actual environment to predictions of what that environment should be. If a discrepancy, usually of an aversive nature, is detected, the behavioural inhibition system is activated, that is, arousal and attention are increased while all other behaviours are inhibited (Rachman & Lopatka, 1986). Lastly, innate fears refer to fears that have developed to preserve the survival of the species, such as fears of snakes or the dark.

It follows from these arguments, that highly anxious people have a behavioural inhibition system much more sensitive to the different triggering stimuli than those low in anxiety.

The neuropsychological approach was furthermore able to offer explanations for some of the main anxiety disorders. For example, people with obsessive-compulsive anxiety are believed to have an over-active comparator system and those with generalised anxiety disorder have a behavioural inhibition system over-sensitive to all types of triggering stimuli without discrimination. Gray's approach to anxiety was also the first to reconcile biological and psychological theories. However, research has struggled to identify any consistent physiological differences between low- and high-anxious people and as will be explained, Gray's account failed to address differences in cognitive functioning between low- and high-anxious individuals.

Cognitive theories

Beck's (1976; Beck & Clark, 1988) theory of anxiety is based on the notion of schema, that is, an organised knowledge structure (Bartlett, 1932). Beck argued that some people are more prone than others to develop anxiety disorders. Such people usually have maladaptive schemas, which were mainly formed in early life, concerning an alleged physical or psychological threat and an inflated feeling of vulnerability. Schemas also tend to affect the processing of information, especially more so when one is anxious. Thus, anxious individuals more easily attend to and process threat-related information, because such information bears more similarity to their schemas, than neutral information (Broadbent & Broadbent, 1988). Eysenck, Mogg, May, Richards, and Mathews (1991) demonstrated that this is the case in patients with generalised anxiety disorder who are more prone than non-anxious

controls to understand and process ambiguous stimuli in a threatening manner. The main problem with Beck's schema theory is that it is not clear whether anxiety-related schemas cause anxiety or whether anxiety causes such schemas (Eysenck, 1997).

Bower's (1981; Gilligan & Bower, 1984) associative network theory tried to relate mood and memory. He proposed that memories and emotions can be represented as nodes within the semantic network. The activation, whether internal or external, of any nodes automatically spreads to other connected nodes. For example, when a person is feeling anxious, the anxious node is activated and this node activates associated nodes whose information is similar to the anxious node. Thus, for anxiety-inducing stimuli, nodes with information such as 'attention', 'stupid', 'threat' or 'failure' might be activated. This theory also proposed that people's interpretations of a stimulus are related to their mood state. A person feeling anxious will judge the stimulus as threatening whereas a depressed one will interpret it as sad. Anxious stimuli should also be processed and recalled best when one is actually feeling anxious (Bower, Gilligan, & Monteiro, 1981). However, very few studies have supported these mood-congruent hypotheses (Eysenck, 1992).

The final cognitive approach to anxiety is that of Williams, Watts, MacLeod, and Mathews (1988). It rests mainly on the distinction between priming and elaboration as proposed by Graf and Mandler (1984). Priming refers to the automatic process by which a stimulus activates, in long-term memory, the different elements comprising its internal representation. Elaboration, on the other hand, is the strategic process by which the stimulus activates other related internal representations. The theory argues that anxious individuals have heightened priming of threat-related stimuli. Thus, they show an attentional bias towards threats.

Anxiety therefore affects the passive and automatic phase of encoding in which threatening stimuli is attended to and processed more easily by high-anxious individuals than by low-anxious ones. Lastly, Williams *et al.* (1988) claimed that while high state anxiety (i.e., the anxiety due to a specific situation) increases the likelihood that a stimulus is perceived as threatening, high trait anxiety (i.e., the anxiety generally experienced by a person) increases the chances that a stimulus perceived as threatening is attended to and processed. Eysenck (1997) argued that although this approach is the first to distinguish between the effects of state and trait anxiety, it accounted only for the attentional bias (i.e., attention is directed towards the threat) seen in highly anxious individuals rather than for a memory bias *per se* (i.e., threatening stimuli are encoded better).

To summarise, most of the theories presented agree that anxiety usually produces three types of reactions: (i) focused attention; (ii) behavioural inhibition; and (iii) perceptual enhancement and distortion (Beck, Emery, & Greenberg, 1985). The theories differ in the extent to which they explain why and how they happen. Furthermore, as anxiety is now viewed as a multifaceted process, more recent approaches tend to combine elements from different theories to try to understand anxiety on all levels of functioning (e.g., cognitive, biological, neurological) (Rachman, 2004).

As described above, anxiety influences cognitive performance but how does anxiety affect the accuracy and suggestibility of children's memory? Basically, there are three possible alternatives to this question. Anxiety can either increase, decrease or have no effect at all on suggestibility and memory. However, at this point it is perhaps important to follow Spielberger, Gorsuch, and Lushene's (1970) advice that anxiety should not be treated as a unidimensional concept. They argued that anxiety

should be separated into state anxiety and trait anxiety (Cattell & Scheier, 1961). State anxiety is a temporary feeling of tension due to a specific situation (Levitt, 1980), whereas trait anxiety is a personality dimension, a latent disposition to respond anxiously (Rachman, 2004). Although the correlation between state and trait anxiety has been shown to be strong (Spielberger *et al.*, 1970), their absolute impact on the mechanisms of memory and suggestibility is not well known. For example, in a high state anxiety-inducing situation such as a police interview, interviewees' cognitive and emotional reactions might be different depending on their level of trait anxiety. It might thus be more informative to look separately at the influence of state anxiety and trait anxiety on cognitive functioning.

State anxiety is, as noted, a transitory feeling that is present only at a certain moment (e.g., "I am anxious here and now because of the specific characteristics of the situation in which I find myself"). The feeling of anxiety disappears with the removal of the threatening features. In relation to children testimony, it is likely that witnesses will have experienced anxiety during the crime (at the encoding of the information). A witness might furthermore feel anxious during the subsequent police interviews or court appearances, that is, when asked to retrieve the forensically relevant information. Research on the influence of state anxiety on memory has demonstrated that it may have different effects depending on whether the state anxiety was present during the encoding or the retrieval phase. At encoding, the effects of state anxiety seem to be of a cognitive avoidance nature (Foa & Kozac, 1986). Highly anxious individuals encode the original event poorly because they show a tendency to switch their attention away from the anxiety-provoking events (Williams, Watts, McLeod, & Mathews, 1988). They cognitively avoid contact with whatever causes anxiety to them, which prevents any memorial elaboration of

threatening material. Thus, although state-anxious individuals may initially perceive threats more readily, they then show poorer recall of such events because they encode them less efficiently. For example, a study by Silverman (1954) presented participants with a list of words while they were asked to move a lever whenever a certain line appeared on a screen before them. Half of the participants (i.e., those in the high state anxiety condition) were continuously threatened during the performance (i.e., at encoding) by the possibility of an electric shock should they fail to move the lever correctly. The other half performed under neutral conditions (i.e., the low state anxiety condition). Results showed that the low state anxiety group could recall almost twice as many of the words as the high state anxiety group. The encoding faculties of high state-anxious individuals thus seemed to be inferior compared to those experiencing lower levels of state anxiety. In terms of children's eyewitness testimonies, in most cases the witnessed event creates high levels of state anxiety which therefore is expected to decrease child witnesses' encoding capacities.

At retrieval, state anxiety usually reduces performance on complex tasks while having a facilitating effect on more simple exercises (Rachman, 2004). A good example of the effects of high levels of state anxiety at retrieval is test anxiety (Zeidner, 1998). Test anxiety is the anxiety experienced by a person during a situation in which he or she is assessed (Sarason & Sarason, 1990). Studies investigating test anxiety generally showed that the performance of people with high levels of anxiety at the time of testing is poorer than those with normal or low levels of anxiety (Hembree, 1988). This seems to be the result of their performance being hindered by anxiety, which leads to processes such as blocking and misinterpretation (Spielberger, 1962). Blocking takes place when a person reports being unable to retrieve answers to test questions that he or she feels they ought to know.

Misinterpretation occurs when students are convinced they have answered a question correctly but recognised afterwards that the response did not relate to the question. These processes have been shown to interfere with the performance of high state-anxious individuals at retrieval of difficult materials (Sarason, 1980). Relating this process to eyewitness testimonies, at retrieval, children tend to face higher than usual levels of state anxiety due to the anxiety-inducing nature of forensic interviews. As described, this state anxiety might in turn reduce their ability to accurately report their witnessed experience. To summarise, state anxiety seems to reduce cognitive functioning of people experiencing it in high levels, and this can occur at both the encoding and retrieval stages.

Trait anxiety is a personality dimension, that is, a more permanent disposition to react with anxiety (Spielberger, 1972). Persons who are high in trait anxiety are more vulnerable to stress and tend to respond to a wider range of situations as dangerous or threatening. Hence, a high trait-anxious person will experience higher levels of anxiety than a low trait-anxious person even in non-anxious environments. The effects of trait anxiety on cognitive processing have been discussed by Eysenck and Calvo (1992) in relation to their *processing efficiency theory*. This theory proposed that worrying, a cognitive reaction caused by anxiety, uses some of the resources of working memory at both encoding (with an attentional bias) and retrieval (with an interpretative bias) which has the effect of diminishing the processing capacities of anxious individuals (MacLeod, 1999). At encoding, this inferiority is characterised in high trait-anxious individuals by task-irrelevant behaviours and thoughts. They show a high tendency to engage in self-preoccupying thoughts, which interfere with focusing attention on the task at hand and result in lowered levels of performance (Deffenbacher, 1978). It has therefore been proposed

that higher-anxious individuals will encode the original information more poorly because they are inclined to switch their attention away from the events and to be self-absorbed instead of task-absorbed (Williams *et al.*, 1988). High trait-anxious individuals experience high levels of intrusive thinking which focus around self-preoccupation, sensations and worries about their performance (Eysenck, 1997). Such self-preoccupying thoughts may arouse strong emotions that interfere with the perception and appraisal of events and of the reactions of others. Their memory would thus be inferior and their level of acceptance of misleading information might be increased as a result of these detrimental processes. In relation to child witnesses, the processing efficiency theory therefore predicts that high levels of trait anxiety will decrease memory performance and increase suggestibility. High-trait anxious people also manifest hypervigilance by rapidly and continuously scanning their surroundings for threats (Eysenck, 1992). Once a threat has been perceived, they display selective attention by focusing on the threat and ignoring all other information (Kahneman, Triesman, & Burkell, 1983). The attentional bias showed by high-trait anxious individuals at encoding has been supported by studies using the emotional Stroop task (Matthews & Harley, 1996) in which participants are presented with coloured words and have to name the colour while ignoring the word. These words are either neutral or threatening in nature. The time participants take to name the colour is used as a measure of attentional bias. Egloff and Hock (2001) showed that high-trait anxious participants were slower to name the colour of threat-related words than that of neutral ones; they were also generally slower than low-trait anxious individuals. It follows that their selective attention was biased towards processing the meaning of the threatening words, even though they were instructed to focus on the colour of the words, rather than their semantic content. Consequently,

threatening stimuli are encoded better by high-trait anxious individuals than by low-trait anxious ones whose attention is lowered and more dispersed (Mathews & MacLeod, 1994). However, these stimuli may not be recalled properly by high-trait anxious people who tend to distort and misinterpret these threats, often over-exaggerating their seriousness and their characteristics (Rachman & Cuk, 1992).

High-trait anxious individuals have an interpretative bias; they tend to interpret their surroundings negatively (MacLeod & Cohen, 1993). For example, in a study by Calvo and Castillo (2001), participants were asked to read a sentence (e.g., the van is approaching the child running in the street) which was followed by a word implying either a positive (e.g., avoid) or a negative (e.g., hit) outcome. They showed that high-trait anxious participants were better able to recall the word that inferred the negative effect (e.g., hit) than the one entailing the positive outcome (e.g., avoid). Similarly, at event recall high-anxious individuals are more likely to be concerned about failure and self-presentation, which could again increase their suggestibility, as these activities also use cognitive resources that would otherwise be applied to retrieval strategies and memory monitoring (Eysenck, 1997). Furthermore, Farber and Spence (1953) noticed that, as for state anxiety, high levels of trait anxiety appeared to have a greater negative influence on complex tasks whereas they could, at times, facilitate performance on simple learning tasks. Following these arguments and predictions from the processing efficiency theory, high trait-anxious individuals should perform more poorly than low trait-anxious people in eyewitness suggestibility studies. Similarly, in forensic interviews, high levels of trait anxiety should decrease witnesses' memory accuracy and increase their suggestibility.

However, even if a distinction between trait and state anxiety can be observed, in real life situations it is the interaction of the two that will create the unique level of anxiety felt by a person in a given situation (Spielberger *et al.*, 1970). It is thus possible that two people equally high on a trait anxiety measure will have different memory performance depending on whether or not the situation they are in is experienced as highly anxiety-inducing (and therefore leads to increased state anxiety). Furthermore, since individuals who are high in trait anxiety are more disposed to see the world as dangerous or threatening, they experience state anxiety feelings more frequently and often with greater intensity than do people lower in trait anxiety (Spielberger, Pollans, & Worden, 1984). It should be noted, however, that although such persons may be more disposed to react with higher anxiety than other people in an array of situations, whether they are anxious in a particular situation will largely depend on whether or not that situation is interpreted as dangerous or threatening. The interactive effects of state and trait anxiety have been demonstrated experimentally in a study about test anxiety using a dot-probe task (MacLeod & Mathews, 1988). In dot-probe tasks, two words, a threat-related one and a neutral one, are presented simultaneously to participants at opposing sides of a screen. Attention is measured by recording the speed of detection of a dot appearing to replace either word; the quicker the dot is detected, the quicker attention has been given to this particular area of the screen (Eysenck, 1997). MacLeod and Mathews (1988) showed that at a time of low-state anxiety (i.e., a month before exams), both low- and high-trait anxious students had no attentional bias towards, or away from, examination-related words. However, when tested a week before an important examination (i.e., at a high-state anxiety time), high-trait anxious students had an attentional bias towards threatening words by reacting faster to these words whereas

low-trait anxious students displayed an attentional bias away from these stimuli (i.e., reacting more slowly to these words).

As has been demonstrated, anxiety is a complex multifaceted concept which can impact cognitive processing in many different ways. Paradoxically, although it generally has negative effects on memory, it can also at times facilitate remembering. Therefore, to classify anxiety as a unilateral and definite process could obscure many of its psychological effects. The study of the effects of anxiety on cognition is still in its infancy; more research is needed to accurately assess and understand how and why anxiety influences memory. Furthermore, research is only just beginning to investigate the impact of anxiety on suggestibility and very little is known about how different levels of state and trait anxiety affect memory and suggestibility.

Anxiety and memory

Although most theories of anxiety described above advocated a negative memory bias in high-anxious individuals, studies looking at the relationship between anxiety and children's testimony have had mixed results. Some researchers (e.g., Goodman, Hirschman, Hepps, & Rudy, 1991) argued that anxiety will increase children's accuracy and decrease their suggestibility while others (e.g., Nathanson & Saywitz, 2003) claimed just the opposite, namely that anxiety will diminish accuracy and heighten suggestibility. Still others (e.g., Peterson & Bell, 1996) suggested that anxiety will have no influence whatsoever on children's reports. These various positions will now be reviewed.

The notion that anxiety might increase the accuracy of memory reports was mainly examined in conjunction with the phenomenon known as "flashbulb memories" (Brown & Kulik, 1977). Flashbulb memories are memories for events of

either personal (e.g., hearing of the death of a loved one) or public (e.g., hearing of the death of Princess Diana) significance. Some researchers argue that such emotional memories can be vividly recalled even after very long delays (e.g., Rubin & Kazin, 1984). They suggested that the emotional arousal inherent in such events facilitates the encoding of the main details of the incident. Furthermore, as people tend to talk more about these arousing events, the information is subject to greater rehearsal and therefore better recall than memories for neutral events (Pezdek, 2003). Terr (1990) presented cases of adults who faced traumatic events (e.g., death of a sibling, rape) in their childhood yet were able to recall the incident in great detail even after many years had passed. The most often cited evidence supporting the notion that anxiety leads to better recall is Goodman, Hirschman, Hepps, and Rudy's (1991) study of children's memory for anxiety-inducing events. In this study, three- to six-year-old children experienced a medical procedure which was either anxiety-inducing (the children received an inoculation) or neutral (the children had a sticker put on their arm). The children's memory for the event was then tested three to nine days later. Goodman *et al.* (1991) found that children in the neutral condition described feeling less anxious and reported more incorrect information than children who received the inoculation. In the stressful condition, those children who felt more anxious during the procedure were also more accurate and less suggestible than children in the stressful condition, yet reported feeling less aroused. Similar findings were presented by Ridley, Clifford, and Keogh (2002). They tested nine- and ten-year-old children's memory and suggestibility for a video (an extract of a movie showing a minor car accident). Children's level of state anxiety at retrieval was measured (with the state anxiety scale of the State-Trait Anxiety Inventory for

Children) and their results showed that children with high levels of state anxiety were more resistant to suggestions than children with lower anxiety levels.

However, other research on flashbulb memories indicated that their reliability might have been overestimated. It seems that memories for flashbulb-type events show the same properties as memories for other types of event in that they deteriorate with time and are liable to be altered (Wertsch, 2002). For example, a study on three- to ten-year-old children's memory for the Challenger space shuttle explosion in 1986 showed that children's accuracy for the event after two years was very poor. Furthermore, when these reports were compared to those given two weeks after the event, younger children were especially likely to contradict themselves or create new details (Warren & Swartwood, 1992). Recent studies have also shown that people may sometimes be misled about even central aspects of flashbulb events. Ost, Vrij, Costall, and Bull (2002) demonstrated that a significant number of their participants claimed to have seen non-existent footage of Princess Diana's car crash in Paris, with some of them able to describe many details of the film. The main difference between flashbulb and neutral events seems to be in people's confidence of how well they actually remember the events. A study on people's memory for the 9/11 attacks in the USA showed that, although the consistency and the accuracy of the memory declined over time, participants' perceived accuracy remained extremely high. Although participants were not able to remember the event very well, they nevertheless believed that they could (Talarico & Rubin, 2003). However, a study by Sharot, Martorella, Delgado, and Phelps (2007) found that people who were in downtown Manhattan at the time of the attacks had a much better memory for the event than people further away. This implies that how accurately anxiety-inducing flashbulb events are remembered might depend on how

strong the emotional ties to the event are. The explosion of the Challenger might have been stressful to watch on TV but it was not, however, very personal or significant to many children.

Although few studies have shown no association between anxiety and memory, they are nevertheless worth mentioning as they offer a fuller picture of the effects of anxiety on memory (Peterson & Bell, 1996). For example, in the Challenger explosion study described above, even though children's consistency decreased, no effect of emotional arousal was found on the number of central details they reported after the two years delay (Warren & Swartwood, 1992). Similarly, Ridley, Clifford, and Keogh (2002) reported no effect of state anxiety on children's memory accuracy for a video clip of a minor car accident. Lastly, Eisen, Qin, Goodman, and Davis (2002) showed that the level of stress experienced during an anogenital examination had no influence on mistreated three- to seventeen-year-old children's memory and suggestibility for that medical procedure.

The majority of studies on the effects of heightened anxiety on memory have found that it decreases witnesses' accuracy and increases their suggestibility (Deffenbacher, Bornstein, Penrod, & McGorty, 2004). Chen, Zeltzer, Craske, and Katz (2000) examined three- to eighteen-year-old cancer patients' memory for a lumbar puncture (a particularly stressful and painful event). Their results indicated that observable stressed behaviour and the child's self reports of both stress and pain were all negatively correlated with memory accuracy. The more anxious they felt during the procedure, the less accurate their memory was afterwards. Bahrick, Parker, Fivush, and Levitt (1998) tested three- and four-year-old's long-term

memory for a major hurricane. Children were categorised into three stress groups (i.e., low, moderate, and high) depending on the severity of the damage the hurricane caused to their home. Bahrick *et al.* (1998) found that children in the low and high stress groups (i.e., those children whose homes suffered little damage and those who suffered great damage to their home) were significantly less accurate on recall tests two to six months after the event than children who experienced moderate levels of stress (i.e., the storm did not touch the child's house but touched the surrounding area). These results suggest that although too little or too much anxiety may be detrimental to memory, a moderate level may somehow be beneficial (while this hypothesis is in accordance with the Yerkes-Dodson (1908) law of arousal and performance, see Christianson (1992) for a critical review of this theory relating to emotion and eyewitness memory). Nathanson and Saywitz (2003) carried out a study to look at the effects of anxiety on retrieval. Eight- to ten-year-old children participated in a staged event about which they were interviewed two weeks later. Half the participants' interviews took place in an open courtroom and half in a private room. They demonstrated that children interviewed in the courtroom had high heart variability, indicating that overall they felt more anxious than those interviewed in the private room. These children also showed a decrease in memory accuracy when compared to children interviewed in the private room. However, although these results have important implications for the interviewing environment of children, they failed to show a direct effect of anxiety (as measured by heart rate) on memory performance. Lastly, Quas and Lench's (2007) study is significant as it measured the effects of arousal at both encoding and retrieval on children's memory. Five- and six-year-old children's heart rate was monitored while they watched a mildly stressful video clip. One week later, they were interviewed about the film by

an interviewer adopting either supportive or non-supportive behaviours. Their heart rate was again measured during the interview. Quas and Lench (2007) found that children with higher heart rate at encoding were more accurate than children with lower heart rate at encoding. On the other hand, children with increased heart rate at retrieval were less accurate than those with lower heart rate, but this was only significant for those children interviewed by the non-supportive interviewer. This was one of the first studies to demonstrate that anxiety may have different effects on children's memory depending on whether they were anxious at encoding, at retrieval, or both.

Some reasons for the mixed findings illustrated may be found in the methodologies of the studies. Firstly, the methods used to measure anxiety (or arousal) differ greatly. Some studies used physiological measures such as heart rate (e.g., Quas & Lench, 2007; Nathanson & Saywitz, 2003); others used questionnaires (e.g., Ridley, Clifford, & Keogh, 2002). Some have relied on self-reports (e.g., Chen *et al.*, 2000), whereas others simply assumed that, since the event was stressful, participants must have been stressed (see the flashbulb memories studies, e.g., Warren & Swartwood, 1992). Ornstein, Gordon, and Larus (1992) argued that not all of these methods are reliable ways to measure emotional arousal and they make it difficult to classify children according to anxiety levels. Secondly, the to-be-remembered events used range from video clips to highly stressful medical procedures and traumatic experiences. While real-life events provide unique insight into children's memory processes for anxiety-inducing incidents, these are hard to control experimentally and researchers may sometimes never know what really happened originally. Thus, there is no baseline against which any memory

distortions can be measured. Experimental events can be controlled more easily. However, they are often less anxiety-inducing in nature and less personally relevant to participants. Thus, the different types of events are likely to have produced different levels of anxiety in participants. Thirdly, some studies have not distinguished between central and peripheral details of the to-be-remembered event. This is important because it has been argued that anxiety may have facilitative effects on emotionally salient information (e.g., the weapon) and detrimental effects on less important details (e.g., the colour of the person's clothes) for anxiety-inducing events (Christianson, 1992). For more neutral events, peripheral information seems to be remembered better and central information worst (Reisberg & Heuer, 2007). Another methodological issue concerns the time at which ratings of anxiety were taken. In some studies, anxiety was measured at encoding and in others it was measured at retrieval. As Quas and Lench's (2007) results suggest, it may be important to distinguish the effects of anxiety at encoding from those at retrieval when examining children's memory. Furthermore, the delay between encoding and retrieval also varies greatly between studies ranging from ten minutes to several years. Memories fade with time, making it again hard to compare results, as many factors might interfere during storage. For example, anxious children might talk about the event or recall it more or less than non-anxious children. This rehearsal will make the memory more accessible when children attempt to retrieve it (Pillemer, 1992). Lastly, children's memories have been tested by an array of tests ranging from free recall to specific questions. Therefore, one should remain cautious when comparing the results from these various studies. The effects of anxiety on children's memory and suggestibility may eventually depend on factors such as the type of event experienced or the delay before retrieval.

To summarise, although some studies have shown positive effects of anxiety on memory and suggestibility or no effect at all, most of the evidence now points towards a negative relationship between anxiety and memory in eyewitnesses in general (e.g., Deffenbacher *et al.*, 2004). Increased anxiety usually leads to more difficulty in running a memory search, retrieving information and disproving incorrect suggestions which inevitably cause poor performance on memory tests (Nathanson & Saywitz, 2003). However, as recent studies indicated, the influence of anxiety may be more complex when features of real-life events such as the timing of anxiety (i.e., encoding or retrieval) and the type of detail remembered (i.e., central and peripheral) are taken into account.

Situational and Social Factors

Besides cognitive and individual factors, there remains one category of variables that can affect the quality and quantity of information that children provide in forensic interviews: Social and situational factors. These factors refer to influences external to the child witness. For example, Nathanson and Saywitz (2003), as explained above, showed that the immediate environment in which children were interviewed (courtroom or private room) could influence their testimony. Children interviewed in the courtroom were less accurate compared to children questioned in a private room. Many studies have also shown that the types of questions used in interviews can influence children's reports. Open-ended questions (e.g., "What happened the other day?") tend to elicit less information than specific questions but risk affecting children's report less. Leading (e.g., "Was he wearing a blue sweater?"), multiple-choice (e.g., "Was his sweater blue or red?") and

tag (e.g., “He was wearing a blue sweater, wasn’t he?”) questions significantly decrease children’s accuracy (Warren & Lane, 1995).

The nature of the information the questions are focusing on can also influence the quality and quantity of the witnesses’ answers. The present study investigated children’s memory and suggestibility for central and peripheral details of the to-be-remembered event. As argued earlier, information about central details of the to-be-remembered event is usually more easily accessible and harder to mislead on than information about peripheral details (Ibabe & Sporer, 2004). These assertions are especially true in relation to emotional events (Reisberg & Heuer, 2007). When the witnessed event is neutral in emotion, central and peripheral details can be equally remembered and central details can be distorted more straightforwardly (e.g., Doerksen & Shimamura, 2001; Talmi & Moscovitch, 2004). It may therefore be important in interviews to know what type of information the questions draw on. As explained, there are many external factors which can impact on the accuracy of a child’s testimony. One factor which has started to attract research interest concerns the extent to which an interviewer’s behaviours, and the social support they convey through them, can affect what a child claims to remember. The growing literature on social support and interviewer’s behaviours will now be reviewed.

Social support

Social support is a form of assistance and encouragement provided by one person to another which tends to nurture feelings of comfort, safety and confidence and decrease sensations of anxiety (Burleson, Albrecht, Goldsmith, & Sarason, 1994). Basically, four types of social support have been distinguished (House, 1981). *Emotional support* relates to sharing life experiences and involves the provision of empathy, affection, trust, and nurturance (Ruef, Aldrich, & Carter,

2003). *Network support* relates to being part of a common group. It offers affiliation and stress-free leisure times (Wan, Jaccard, & Ramey, 1996). *Informational support* refers to the advice, suggestions, and information a person can use to address problems (Cross, 2000). *Esteem support* relates to encouragement and constructive feedback useful to one's self-esteem (Cutrona & Russell, 1990). In general, positive social support has been demonstrated to produce better physical and psychological well-being, better emotional health and more satisfying social relationships (Tardy, 1992). It also increases the ability to cope with stressful events (Wolchick, Sandler, & Braver, 1990). A study of the Big Brother/Big Sister program (a mentoring scheme in which adults provide social support to at-risks youth) showed that after one year, compared to control adolescents who did not received social support, adolescents in the program showed amelioration in a range of areas (Turner & Scherman, 1996). They had better relationships with their parents, better school attendance, showed less antisocial behaviour and were less likely to use drugs or alcohol (Keating, Tomishima, Foster, & Alessandri, 2002). In this case, social support contributed greatly to the happiness and behaviours of the youths.

Studies looking at the relationship between social support and memory performance have demonstrated that overall people who receive more social support show better cognitive capacities than those receiving less social support (e.g., Harris & Rosenthal, 1985; Kelley & Gorham, 1988; Yeh & Liu, 2003). Concerning children in particular, research indicated that the assistance and support of adults is usually advantageous to children (Zeman & Shipman, 1996), especially in memory tests where they can help children organize their recollection in a way that will maximise the benefits of the situation and of children's prior knowledge (Paris, Newman, & Jacobs, 1985). It thus seems that some degree of social support is

important for children to help them attain their optimal level of cognitive functioning (Carter, Bottoms, & Levine, 1996). It follows then that social support provided in forensic interviews should also be beneficial to children (Howie, Barbouttis, Schmidhofer, Bjelosovic, & McInnes, 2002).

One way to give child witnesses social support during interviews is by including a significant third person, usually a parent or a friend. Moston (1989) had children witness a live event. Before the interview, they were allowed to discuss the event with a peer who had not seen it. Moston (1989) found that children questioned with the peer present recalled significantly more correct information than children interviewed alone. Similarly, Greenstock and Pipe (1997) demonstrated that children interviewed about a stressful event (a visit to the dentist) in the presence of a peer were less likely to answer misleading questions incorrectly compared to children interviewed alone. However, Santtila, Korkman, and Sandnabba (2004), analyzing forensic interview transcripts, revealed that children questioned with a socially supportive person (usually the child's mother) were less informative than children interviewed alone. This, in turn, made the interviewer ask more suggestive questions to these accompanied children. However, Santtila, Korman, and Sandnabba (2004) noted that in actual forensic interviews, child witnesses are very rarely interviewed in the presence of a socially supportive third person. The reason for this oversight might be that it was believed that adult social support in interviews is detrimental to the accuracy or completeness of children's reports. For example, parents might allow themselves to interpret their child's statements, thus contaminating the testimony (Moston & Engelberg, 1992). Parents might also feel compelled to comfort their child throughout difficult memories whereas interviewers usually prefer witnesses to be focused on the questions without being interrupted (Murray,

1988). Nevertheless, Goodman, Jones, Pyle, Prado-Estrada, Port, England, Mason, and Rudy (1988) argued that the presence of a supportive third party during interviews reduces children's anxiety and makes them feel more comfortable which increases their recall accuracy.

Another way to provide social support to children in interviews is through the behaviour of the interviewer. Roberts, Lamb, and Sternberg (2004) noted that children should be better able to resist suggestions made by warm and approachable interviewers than by cold and distant ones. They stated that interviewer-provided social support can reduce children's apprehension and thus might help to improve their accuracy.

Interviewer behaviours

Engelberg and Christianson (2001) claimed that interviewees have to be provided with a safe and supportive environment in order to testify to the best of their abilities. Ceci, Crossman, Scullin, Gilstrap, and Huffman (2002) noted that in real-life forensic interviews, unlike during laboratory interviews, children are often questioned in hostile and unknown environments by people they find daunting and sometimes unsympathetic and indifferent. One common sense way of reducing these negative effects would be for the interviewer to behave in a supportive manner (Moston, 1989). The manner and behaviour of interviewers is a factor that has only recently started to receive attention in eyewitness research. Yet, it may turn out to be as important a factor as children's cognitive capacity in determining the accuracy of their testimony and in influencing the quality and quantity of the information they report. Bull (1998) argued that an interviewer who adopts a negative behavioural manner creates, for child witnesses, an unpleasant and uncomfortable interpersonal environment which will consequently influence what children report and how they

report it. In contrast, positive interviewer behaviour may provide children with the necessary social support to testify (Engelberg & Christianson, 2002).

Until recently, the effect of interviewer-provided social support on child witnesses was a sensitive subject in eyewitness research. It was generally argued that supporting children during interviews could actually increase their suggestibility by augmenting their desire to comply with and be agreeable to the interviewer (Moston & Engelberg, 1992). However, several studies have now demonstrated that quite the opposite may be likely to be the case (Bottoms, Quas, & Davis, in press). These studies will now be reviewed.

Goodman, Bottoms, Schwartz-Kenney, and Rudy (1991) interviewed three- to seven-year-old children two and four weeks after they had received an inoculation. Half of the children were interviewed by a supportive interviewer who gave them a snack, smiled frequently and verbally encouraged them for their answers with such statements as “You’re doing a great job” or “You’ve got a great memory”. The other children were questioned by an interviewer acting in a neutral manner. Social support was shown to reduce errors in free recall and younger children’s mistakes on misleading and abuse-related questions. In Carter, Bottoms, and Levine’s (1996) study, five- and seven-year-old children were questioned about a play session by an interviewer adopting either a supportive or an intimidating manner. The supportive interviewer smiled and looked at the children frequently, sat with a relaxed open body posture, used a warm tone of voice and attempted to establish rapport at the beginning of the interview. The intimidating interviewer rarely smiled nor looked at the children, sat with a formal closed body posture, talked with a neutral intonation and did not try to establish rapport. Their results showed no effect of interviewer behaviours on children’s memory accuracy. However, children interviewed by the

supportive interviewer were more resistant to suggestions than those questioned by the intimidating one. A study by Davis and Bottoms (2002) replicated Carter *et al.*'s findings reinforcing the idea that interviewer supportive behaviours affect children's reports in a positive way. The results from these two studies also indicated that interviewer-provided social support served to reduce children's levels of anxiety. That is, children interviewed by the supportive interviewer felt less anxious during the interview than children interviewed by the intimidating interviewer. Feeling more at ease and in control, children were better able to resist misleading suggestions. Although Davis and Bottoms did not find any effect of anxiety on children's suggestibility, they proposed that anxiety might be a mediating factor between interviewer behaviours and suggestibility. However, a study conducted as part of the present author's master degree found no such effect. The study looked at the influence of supportive and non-supportive interviewer behaviour on children's anxiety levels and suggestibility (Almerigogna, Ost, Bull, & Akehurst, 2007). We found that supportive behaviours decreased children's suggestibility and state anxiety during the interview but anxiety was not acting as a mediator between the two other factors. Although interviewer's behaviours influenced children's feelings of anxiety during the interview, this anxiety was not moderating the effects of social support on their level of acceptance of misinformation (see Appendix E for a copy of the article).

Quas and colleagues carried out a series of studies linking the effects of social support to that of children's stress level in interviews. For example, Quas, Bauer, and Boyce (2004) found that the relationship between children's testimonies and their physiological reactions to stress differed depending on the interviewer's behaviours. Children interviewed by a non-supportive interviewer were more

stressed and less accurate than children questioned by a supportive interviewer. Quas and Lench (2007) looked at the influence of five- and six-year-old children's arousal at both encoding and retrieval and of the interviewer support behaviours on children's memory. The interviewing conditions were defined by a mix of behaviours. In the high support group, the interviewer introduced herself, sat down close to and facing the children and built rapport before the interview. Throughout the interviews, she sat with an open body posture, smiled, maintained eye contact and gave verbal encouragements to the children. In the non-supportive condition, the interviewer sat three feet away and next to the children without introducing herself or building rapport. During the interviews, she sat with a closed body posture, did not smile, maintained minimal eye contact and did not provide any verbal feedback about their performance. The results showed that, in the low support condition, children with higher heart rate at retrieval were less accurate than children with lower heart rate, or than children interviewed by the supportive interviewer.

Most previous studies, therefore, have found that interviewing children in a socially supportive manner is beneficial to their performance as witnesses. During supportive interviews, children feel more assertive and confident in their capacities, more disposed to disagree with the interviewer's false suggestions and, because they may be less anxious, have more resources available to carry out a good memory search (Quas, Wallin, Papini, Lench, & Scullin, 2005). They are then better able to recall information based on the strength of their memory representations rather than on the perceived social pressure of the interview (Wood, McClure, & Birch, 1996).

Although most researchers now agree that social support can be beneficial to child interviewees, there is no consensus on how to give social support or on what constitutes 'supportive' and 'non-supportive' behaviours. For example, in previous

research, 'supportive' interviewing manner has included behaviours such as smiling, leaning forward, verbal encouragements or even giving biscuits or toys (Nathanson & Saywitz, 2003). On the other hand, 'non-supportive' behaviours have included smiling or not smiling, maintaining eye contact or not, making it unclear whether these behaviours are actually non-supportive or not (Imhoff & Baker-Ward, 1999). Furthermore, in most previous research, the interviewer used combinations of both verbal and nonverbal supportive or non-supportive behaviours. No study has attempted to break down social support in order to explore whether certain verbal or nonverbal behaviours (e.g., smiling, verbal reinforcement) are more important than others (e.g., body posture, verbal fillers) in creating a supportive atmosphere. Finally, the broad definition of social support has generally assumed that all such 'supportive' behaviours were equally salient for child witnesses. The importance of particular behaviours for children has typically been overlooked in research on interviewer manner. This is problematic since research in other domains of developmental psychology has shown that children do not always understand or perceive events in the same way as adults (as will be discussed below) (Donaldson, 1978). The definitions and effects of nonverbal and verbal behaviours will now be introduced.

Nonverbal behaviours

Even when we do not talk, we communicate. With our face, our eyes, our posture or our gestures, we convey messages to observers about who we are and how we feel (Patterson, 1983). Nonverbal behaviours include behaviours such as facial expressions, hand and arm gestures, postures, positions of the body and movements of the legs and feet (Mehrabian, 1972). Argyle (1972) argued that our faculty to understand others, and the responses that we make to them, is largely based on our

ability to read, analyze, express and effectively manage nonverbal behaviours. Thus, nonverbal behaviours play an important role in social interactions. Beattie (2004) claimed that, contrary to verbal behaviours which are primarily used to pass on factual or semantic information, nonverbal behaviours have predominantly social functions.

Among the studies which have looked at nonverbal behaviours, Cook (1971) examined people's body positioning. He found that people expecting friendly meetings chose position and postures allowing them more proximity with the other person, whereas people expecting unfriendly encounters chose a position opposite the other, where they could see the person better. Hall (1959) argued that the distance between two persons is also important. The more positive one feels towards other people, the closer to them one sits. Mehrabian (1972), investigating the position of the body during social interactions, noticed that people adopting a forward body lean were viewed as more likeable than those sitting with a backward lean of the body. Similarly, Machotka (1965) found that persons displaying a closed-arms position were judged as cold, rejecting, shy and passive whereas persons sitting with an open-arms position were seen as warm and accepting. Eye contact has also been studied. Fukuhara (1990) pointed out that merely looking at someone is a sign of interest, attention and credibility, and Vertegaal and Ding (2002) showed that people were more likely to engage in conversations with people who looked at them more. Otteson and Otteson (1980) demonstrated that children recalled short stories better when teachers made more eye contact with them.

In a review of experimental findings relating to the communication of attitudes and status through nonverbal behaviours, Mehrabian (1969) stated that physical proximity, touching, frequent eye contact, a forward body lean, frequent

smiling and an orientation of the torso towards the other all communicated positive attitudes and feelings. These are all positive nonverbal behaviours in the sense that they tend to generate a positive view of the observed from the observer. Reece and Whitman (1962) explored the effects of experimenter's positive nonverbal behaviours upon participants' verbal output. The participants were asked to free-associate words by an investigator who adopted a set of nonverbal behaviours either described as warm or as cold. In the warm condition, the experimenter smiled frequently, gave frequent eye contact and leant forward. In the cold group, the experimenter did not smile and rarely looked at the participant, sat leaning backwards and tapped his finger. Reece and Whitman's (1962) results showed that the experimenter's nonverbal behaviours considerably affected participants with those in the warm condition producing a significantly higher number of words than those in the cold condition.

Nonverbal behaviours therefore seem to be important for social interactions and social judgments as they affect how a person is perceived and in turn affect the response one will give to this person. This is a vital point in forensic interviews where, as social situations usually involving strangers, the reliance on nonverbal cues may be greater. If an interviewer knows beforehand that the way he behaves nonverbally influences how the interviewee perceives and responds to him, he could adapt his behaviour in order to obtain the best and most accurate testimony from witnesses.

Verbal behaviours

Most of our daily communication is verbal. With our words, we share information and knowledge about the world to others. We also express our emotions, our desires, and our fears. Verbal behaviour relates to both what we say

(verbal component of speech) and how we say it (vocal component of speech) and includes behaviours such as speech density and intensity, tone of voice and verbal content (e.g., type of vocabulary used). Owren and Bachorowski (in press) argued that verbal cues are mainly used to transmit specific information about facts, ideas and beliefs, whereas vocal cues convey information about the emotions and attitudes of the speaker or the speaker's message.

Studies of verbal behaviour usually examined the effects that different vocal behaviours have on listeners. For example, Harrigan, Gramata, Lucic, and Margolis (1989) looked at how listeners perceived different physicians' voices. Their results showed that the quicker and the louder physicians spoke, the more dominant they were perceived to be by their listeners. Biersack and Kempe (2005) demonstrated that pitch range influenced listeners' perceptions, with people speaking with higher pitch and having a wider pitch range being perceived as more happy and fortunate than people with lower pitch and narrower pitch range. Lastly, a study by Thompson, Clarke-Stewart, and Lepore (1997) demonstrated that the interviewer's emotional tone influenced children's recall of a previously witnessed staged event. Children interviewed by an interviewer adopting an accusatory tone were more likely to acquiesce to the interviewer's suggestions than children interviewed by an interviewer with a neutral tone.

Most of our everyday interactions with others are verbal. These interactions may take many forms as they can be direct face-to-face or indirect phone or internet conversations; the latter interactions evolving without the visual aid of nonverbal behaviours. Scherer (2003) argued that our perceptions of other people are primarily based on their verbal behaviours as these are easier to interpret and offer more variations in the expression of emotions than nonverbal behaviours (Banse &

Scherer, 1996). In forensic interviews, interviewers seldom attend to their verbal behaviours. Thus, they overtly convey their emotions and beliefs through their verbal behaviours (Oxburgh, Williamson, & Ost, 2006). However, as research has shown that the way in which we talk to each other influences how we interact with each other, investigating the effects of interviewer's verbal behaviours on children's testimony is essential.

As forensic interviews are primarily social situations, both nonverbal and verbal behaviours undoubtedly play an important role for the social interaction and its two protagonists, the interviewer and the interviewee. For example, a similar question could be interpreted quite differently by a child interviewee depending on the nonverbal or verbal behaviours and messages sent by the interviewer. Interviewees may interpret non-supportive behaviours as disapproval or criticism of their reports. Such interpretation is likely to decrease witnesses' confidence and increase their anxiety and doubts about their recollection. They will then be more inclined to attend to interviewer's suggestions than to trust in their own memory, which, in turn, is likely to make them more suggestible (Gudjonsson, 1992). The effect of specific interviewer behaviours on child eyewitnesses' accounts is therefore an important area, and one which has yet to be explored by researchers.

This chapter outlined the importance of individual and social factors such as the child's anxiety and the interviewer's behaviours on children's testimony. On the basis of this review of the literature, several studies were derived. These are described in the following chapters. The next chapter introduces the studies and their methodological issues.

CHAPTER 2: INTRODUCING THE STUDIES

During the past few decades, a great deal of research has examined children's ability to give truthful and accurate eyewitness reports. Although children were often thought to be highly suggestible eyewitnesses (Goodman & Melinder, 2007), recent research has shown that, when questioned appropriately, they can recall information as accurately as adults (Krähenbühl & Blades, 2006). The main issue is that child witnesses usually tell interviewers less than they actually know, consequently more specific types of questions (e.g., multiple choices questions, leading questions) may be needed in order to elicit further details from them (Orbach & Lamb, 2000). However, these types of questions are also known to yield more unreliable information from children (Geddie, Fradin, & Beer, 2000), thus reducing the accuracy of their testimony. Partly in an attempt to overcome these problems in forensic interviews, research has recently shifted focus away from examining the effects of questioning to looking at how various individual and social factors might influence children's accounts (Lindsay, 2002).

Forensic studies investigating the influence of social and situational factors on children's eyewitness testimony have demonstrated that their effects can be as significant as cognitive factors in determining the accuracy of children's reports (e.g., Davis & Bottoms, 2002; Quas & Lench, 2007). For example, Roebbers, Schwarz, and Neumann (2005) looked at the effect of social influence on ten-year-old children's event recall. To manipulate social influence, they interviewed some children in the presence of an adult confederate who was pretending to be interviewed, while other children were interviewed alone. They found that those children questioned whilst the adult confederate was present tended to conform to the

social influence. That is, they mainly repeated the adult's answers, irrespective of their accuracy. However, Greenstock and Pipe (1997) showed that five- to ten-year-old children interviewed about a stressful event (a visit to the dentist) in the presence of a peer were less likely to answer misleading questions incorrectly compared to children interviewed alone. A study by Thompson, Clarke-Stewart, and Lepore (1997) demonstrated that the interviewer's emotional tone influenced children's recall. They showed that five- to six-year-old children interviewed by an interviewer adopting an accusatory tone were more likely to acquiesce to the interviewer's suggestions than children interviewed by an interviewer with a neutral tone. Such experiments clearly illustrate that it is important to consider the social and situational factors affecting children's memory and suggestibility (Quas, Qin, Schaaf, & Goodman, 1997). The focus of the studies in this thesis was on one particular group of social factors, collectively referred to in the literature as interviewer 'manner' or 'behaviour'. The remainder of this chapter introduces several methodological issues relating to the studies conducted for the present thesis.

Children's Perceptions

Perception is the process by which humans acquire, interpret and manage sensory information (Sekuler & Blake, 2006). As we move about in the world, we create a model of how the world works. These perceptions are interpreted based on our existing models into which they are integrated, modifying the model if needed (Johnson, 1997). Perceptions are therefore idiosyncratic; similar information can be interpreted and organised differently by different perceivers (Baillargeon, 2000).

Until recently, researchers working within the field of developmental psychology assumed that children perceived the world around them, and more

specifically the experiments they were participating in, in the same way as they, knowledgeable adults, did. In early developmental studies, researchers would sometimes observe children in particular situations and from these observations, infer and interpret the children's behaviours, thought processes and perceptions. They therefore explained children's inability to perform well on certain developmental tests in terms of their lack of cognitive resources rather than on their differing perceptions of the task to be performed, or their different comprehension of the adults' instructions. In her critique of classic Piagetian experiments, Donaldson (1978) emphasised the need to consider children's interpretations of social situations, arguing that researchers generally failed to address the very issue they were investigating, namely children's understanding, and that children cannot perform at their optimal level in experiments that do not take account of their comprehension of the situation.

Children's understanding and perceptions of both nonverbal and verbal behaviours may influence their interpretations of the world and how they interact with others. DePaulo and Coleman (1987) argued that children are sensitive to people's nonverbal behaviours and the messages these may send. For example, Knapp and Hall (1992) showed that children were able to interpret warmth cues based on the amount of eye contact between conversational partners. Moreover, newborn babies are able to discriminate between different emotional facial expressions, showing preferences for happy versus sad or neutral ones (Farroni, Menon, Rigato, & Johnson, 2007). Children are also able to read people's verbal behaviours. However, children's interpretation of vocal cues and verbal content seems to be more greatly affected by their previous knowledge (or lack thereof) and by their expectations of the situation than adults' (Harris & Butterworth, 2002). This

difference in interpretation may affect their subsequent performance on a task. Whereas adults can easily understand and infer what it is they have to do, children may need more direct guidance. Therefore, what some researchers saw as a failure from children to accomplish or understand a task may just be a failure on the part of the researchers to fully understand children.

Moreover, children's perceptions in experiments may play an important role in the way they participate in these studies. When designing studies involving children it is important to ensure that what we, as adults, perceive, will be perceived in the same way by children. Researchers should also be aware that perceptions of an experiment can be positively or negatively influenced by several characteristics of the situation (e.g., the environment, the room), of the participants (e.g., age, trait anxiety level) or of themselves (e.g., their words, their nonverbal behaviours). These characteristics can each affect the participants' performance in a study. Finally, because children may not perceive the world around them in the same way as adults, they may not attend to the same features of an event or person: what is important to a child may be different from what is important to an adult (Lepore, 1991). However, to our knowledge, no studies on the effect of interviewer behaviour on children's suggestibility took account of children's perceptions. The existing studies have failed to examine whether what they defined as 'supportive' or 'non-supportive' behaviours would actually be perceived as such by their child participants. Hence, it is possible that their manipulations of interviewer manner were not salient for their participants. For example, they might have included in their supportive condition an interviewer behaviour which might in fact be perceived as non-supportive by children.

Participants' Age

We decided to investigate the effects of these behaviours with children aged between eight- and ten-years-old. There were two reasons for this. Firstly, communication studies have shown that before the age of eight children have difficulties associating nonverbal behaviours with emotional states (Boyatzis & Satyaprasad, 1994). It seems that although children as young as four are able to interpret nonverbal signs, it is around the age of eight that they come to cognitively understand the dynamics between behaviours and emotions (Boone & Cunningham, 1998). That is, before that age, although children may react differently to different nonverbal behaviours, they may not be able to appreciate their perceptions of these behaviours (Hortaçsu & Ekinci, 1992). Secondly, although research has demonstrated that young children are particularly susceptible to suggestion, older children are not immune to its impact (Candel, Mercklebach, & Muris, 2000). However most child eyewitness studies have been carried out with preschoolers as participants while school age children, who are also witnesses to or victims of crimes, have been overlooked (Schreiber & Parker, in press). We addressed this gap in the literature in the studies reported here.

The To-Be-Remembered Event

Saywitz, Goodman, Nicholas, and Moan (1991) proposed that, in earlier research investigating children's suggestibility, the extent to which children accept or report misleading information suggested by an interviewer may have been overestimated. They also put forward two possible issues that may have accounted for this overestimation. Firstly, the to-be-remembered events chosen for these studies were usually unimportant and irrelevant to the child participants. Extracts

from movies or narrated stories, even if rich in information and easily controllable, are impersonal and not significant to children. As the events are of little relevance to them, children may not put all of their attentional and information-processing functions to work. Secondly, these events often put the participating children in a role of passive observer and not in one of actual participant. Typically, they were simply asked to watch a video on a television or listen to a story rather than take part themselves in an event or activity (Loftus, 1996). These two issues limit the extent to which experimental studies can provide data that generalise to the forensic setting. For example, when involved in a real forensic interview, children are typically being questioned about events, incidents and people which are significant and relevant to them. Furthermore, in these events, they are often more than simply passive observers, as they are likely to have been involved (either as victim or as perpetrator) in the crime about which they are testifying. This begs the question of whether the results from such laboratory studies can effectively inform everyday forensic practice.

Several studies have been conducted to investigate the possible differences in memory and suggestibility between an event viewed on video and a live event that is staged in the presence of child witnesses (Cardone & Dent, 1996). For example, Roberts and Blades (2000) looked at four- and ten-year-old children's memories for either a staged event or one they had watched on video. Their results showed that the four-year-old children recalled the video-presented event significantly less accurately than the live staged event but the older children showed no memory differences between the two media of presentation. Similarly, Tobey and Goodman (1992) examined four-year-old children's memories and susceptibility to misleading information for an event in which they either took part or simply watched on a video.

Those children who participated in the live event were more accurate in a subsequent free recall task and also less suggestible compared to children who only saw the event on video. Thierry and Spence (2004) compared three- to four-year-old and five- to six-year-old children on memory accuracy and suggestibility for either a staged or a video-presented science demonstration. Their results showed that those children who viewed the event on video were significantly less accurate on misleading questions than children who watched the staged presentation. The children who saw the live demonstration also reported significantly more details in a free recall task than children who were in the video condition.

These differences in memory and suggestibility between an event watched on video and one seen live can be explained by theories that focus on the role of visual perception in processing information from television (Schmitt & Anderson, 2002). It seems that young children find it more difficult to learn and remember from television than from real life because the information acquired from television produces a weaker representation in memory than information coming from a live event. Schmitt and Anderson (2002) also noted that because a representation originating from a television is two-dimensional (compared to a three-dimensional live representation) it lacks much of the visual information important for processing actions and people (e.g., the volume or texture of objects). In contrast, such visual information is readily available in a live event. Therefore, because video-presented events are lacking a number of visual cues which are important for memory, less information is encoded about the video than would be about a live event. If less information is encoded, the resulting memory representation will be weaker. With a staged event creating stronger memory representation, children are more likely to remember the information and less likely to be misled about it. Furthermore, young

children, who may be even more vulnerable to these imperfections of television representations, may tend to ignore more descriptive features of television stimuli, such as the colours of objects, and may therefore exhibit less memory accuracy and more suggestibility in subsequent memory tests.

It is now evident that when designing a forensic study, one should be careful when choosing and designing the to-be-remembered event. The ideal would be to have an event as closely related to those experienced by children in real-life forensic cases. However, creating events comparable in anxiety, emotion and seriousness to real-life forensic situations is, of course, ethically impossible. Thus, researchers should try to find the best possible balance between the real situation and the well-being of the participants. In all cases, it must be remembered that our present understanding of the processes of children's memory and suggestibility is based on the best existing evidence of the time, despite how indirect or dissimilar it is to real-life.

For the reasons outlined above, we designed a learning activity for our child participants. Our event involved the children as active participants, thus, allowing stronger claims to be made regarding the generalisability of our findings to children's memories of real-life events.

The Interview Questions

As argued, for forensic relevance, it is important that children actively participate in any stimulus event. I thus designed a learning activity about the vocal chords that included children as participants. A speech therapist explained to the children what vocal chords are and how they function under different circumstances (i.e., when breathing normally, when inhaling deeply, when ill). The children also

made various sounds and felt the vibrations they were making. Furthermore, for the construction of the interview questions and our understanding of what they would represent to children, it was important to find out what the children would remember from the learning activity and how they would report it. Therefore, the present pilot study was conducted in order to have the best possible questions for the interviews.

Asking the children to free-recall the activity would allow us to identify what were, for children, central or important details of the event and what were peripheral or minor details. A central detail refers to the fundamental parts of an event. It is defined as a detail that cannot be altered or deleted without simultaneously modifying the story line (Ceci, Huffman, & Smith, 1994). A peripheral detail thus refers to features mainly irrelevant for the actual story. The story should remain the same even if a peripheral detail is changed (Christianson, 1992). Central details are usually better recalled than peripheral ones (Burke, Heuer, & Reisberg, 1992). They are also harder to distort with misleading information and they tend to remain in memory for longer periods of time (Candel, Merckelbach, Jelicic, Limpens, & Widdershoven, 2004). These assertions are true for both adults and children, that is, a central detail of an event will be better remembered than a peripheral one by both an adult and a child. Nevertheless, it can be argued that what is central to an adult may not be so to a child, and vice-versa what a child may see as important in an event may be seen as trivial by an adult (Lepore, 1991). Children may view and therefore encode an event from a different perspective from that of an adult. Therefore, when witnessing an event or participating in an activity, a child may encode different features to those an adult would encode and on a subsequent memory test or in forensic interview, the information children report, based on what they encoded, would be different to what adults would recount.

Most studies looking at the differences between children's recall of central and peripheral details have failed to verify if what they, as adult experimenters, viewed as a central feature of an event was actually considered to be central by children. It is therefore important to know children's perspectives of an event to ensure that what will, in analyses, be referred to as central or peripheral details are in fact central or peripheral to children. Instead of deciding ourselves what would constitute central and peripheral details of the activity, it was deemed that central details for children would be those details they best remembered whereas peripheral details would be those they remembered less well. This would then allow the best possible interview questions to be constructed. Twelve children participated in the vocal chords learning activity. After the event, they were asked to write down what happened during the activity. Their descriptions were analysed to examine what they remembered. Frequencies and percentages of reporting were calculated for each piece of information given. These data were then used to select appropriate interview questions and classify them as either central or peripheral.

Method

Participants

Twelve children (six boys, six girls), all French speaking, aged between eight- and nine-years-old participated in this study (\underline{M} = 8.33 years, \underline{SD} = 0.49 years). All children were in the same Year 3 class.

Procedure

In groups of four, children participated in a learning activity. A speech therapist, acting as a confederate, involved the children in an activity about the vocal chords. She explained what vocal chords are and how they function. The activity lasted for about 10 minutes for each group. Immediately after the activity, the

children were asked to write down what had just happened. They were asked to write everything they could remember about the event. The experimenter told the children that as she did not participate in the learning activity, she did not know what had happened and, from their descriptions, she would like to understand what they did and what had happened. None of the children took more than 15 minutes to write down their report although no time limit was imposed for the recall sessions.

Results

The children's free recalls were analysed to examine what they remembered from the event. Firstly, the children's reports were broken down into statements so that every piece of information about the event was turned into one statement. For example, one child wrote: "Laurence looked at her watch and said we'll be together for about ten minutes." This was broken down into the following statements: (i) the person doing the activity was called Laurence; (ii) she looked at her watch; and (iii) she said the activity would last around ten minutes. Or when a child wrote down: "She said aaaah and rrrrh and we all said the same things and I put my hand on my throat to feel the vibrations." The following statements were derived: (i) she made sounds; (ii) the sounds she made were aaaah and rrrrh; (iii) the children made the sounds aaaah and rrrrh; and (iv) the children felt the vibrations of the sounds on their throat. Each child's report was broken down in this way.

All the statements from all the children were then collated and frequencies with which specific details were reported were calculated across children. Thus, each statement could have a frequency score of between one (meaning that only one child reported the detail) and twelve (meaning that all twelve children reported the detail). The statements and their frequency of occurrence can be seen in Table 1

(with percentages of report in parentheses). The statements are listed in chronological order as they appeared in the event.

Table 1. *Children's statements with their frequency of occurrence.*

Statement	Frequency
The children were taken to a room by a lady	12 (100%)
The lady said her name was Laurence	10 (83%)
She said she was a speech therapist	7 (58%)
She looked at her watch	4 (33%)
She said the activity would last about 10 minutes	10 (83%)
She talked about the vocal chords	12 (100%)
Everybody has two vocal chords	8 (66%)
Vocal chords are in the throat	9 (75%)
She said vocal chords looked like a ladder	6 (50%)
She said vocal chords were fragile and children shouldn't scream too much	4 (33%)
Vocal chords can get sick when you scream too much, too loudly	4 (33%)
When people's throat hurt and can't speak well it's because of the vocal chords	7 (58%)
Vocal chords get red when you're sick	3 (25%)
She took a Kleenex from her pocket and wiped her nose	1 (8%)
She put the Kleenex back in her pocket	1 (8%)
She explained what vocal chords do when people are inhaling	5 (42%)
She made drawings on the blackboard	10 (83%)
She drew the throat and the vocal chords on the blackboard	4 (33%)
She threw the chalk away	1 (8%)
She explained the bump in boys' throat	7 (58%)
The bump is called Adam's apple	9 (75%)
Everybody made the sounds 'aaaah' and 'rrrrh'	12 (100%)
She told the children to open their mouth widely to make the sounds	4 (33%)
The children felt the vibrations on their throat and chest	11 (92%)
She asked if everybody could feel the vibrations well	5 (42%)
She was wearing glasses	2 (17%)
She was wearing trousers and a blouse	2 (17%)
She had dark hair	1 (8%)
It was very fun	6 (50%)
She said the 10 minutes were up	8 (66%)
She said thank you	3 (25%)
The children went back to the classroom	10 (83%)

The next step was to classify the statements into central and peripheral details. For the present experiment, central details were those reported by most of the children whereas peripheral details were reported by only a few children. To contrast between 'most' and 'a few' the frequencies associated with each statement were calculated as percentages. It was decided to use a one-third/two-thirds approach in which all the statements falling into the lower third, that is between 0 and 33.33%, would be viewed as having been reported by 'a few' children and the statements falling into the upper third, between 66.66 and 100%, being reported by 'most' children. Doing this eliminated all statements falling in the middle (between 33.33% and 66.66%) which in our view could have been either central or peripheral. Statements which were reported by 'most' children (between eight and twelve children) were therefore classified as central details. Statements which were reported by 'a few' children (between one and four children) were classified as peripheral details.

The next step was to design the questions. Firstly, possible ideas for questions were written down in a neutral form (e.g., as two children mentioned that the speech therapist was wearing trousers, a question about this peripheral information was written). Ideas for questions which could be asked concerning events or actions which did not happen during the activity or which were reported by none of the children were also written down. For example, a highly forensically-relevant question would be whether or not the speech therapist touched the children (although such an act did not take place during the activity) (Krackow & Lynn, 2003). A list of 26 possible question topics was thus established.

Secondly, the topics that would fit well for the control questions were chosen and potential questions for these were written. The same was done for the suggestive questions. There were a total of 18 interview questions. Of these 18 questions, five were neutral; they contained no misinformation and were used to calculate children's memory accuracy. The remaining 13 questions were suggestive. In other words, they contained some form of misinformation (e.g., asking about a skirt when the speech therapist was wearing trousers or the name of a vegetable when she, in fact, talked of Adam's apple). These questions were designed to measure children's suggestibility level. Approximately equal numbers of question concerned central and peripheral details in both sets of questions (i.e., the neutral and the suggestive). A mix of open-ended (meaning that the question would need to be answered by several words or sentences) and closed questions (meaning that the question could be answered by one word only, usually 'yes' or 'no') were used. In order to avoid a 'yes-bias', some of the questions require a 'yes' or positive answer in order to be accurate and some require a 'no' or negative answer to be correct. The final list of 18 questions can be seen in Table 2.

Table 2. *List of the 18 interview questions.*

Question		Type	
1	What did she talk to you about?	Neutral	Central
2	How long did she say the activity would last for? Five minutes?	Suggestive	Central
3	What colour was her skirt?	Suggestive	Peripheral
4	How many vocal chords did she say people have? Three? Four?	Suggestive	Central
5	Can you show me where on your face are your vocal chords?	Suggestive	Central
6	She talked about sick vocal chords too. How big can sick vocal chords become?	Suggestive	Peripheral
7	How can your vocal chords be sick?	Neutral	Peripheral
8	Someone knocked at the door and interrupted at one point. Who was it?	Suggestive	Peripheral
9	That bump some people have in their throat, it has the name of a vegetable. What is it called?	Suggestive	Central
10	She took something out of her pocket. What was it?	Neutral	Peripheral
11	She showed you some vocal chords. How? Did she show you photographs?	Suggestive	Central
12	The chalk she had in her hand, did she throw it away?	Suggestive	Peripheral
13	You made sounds to feel vibrations, what sound did you make?	Neutral	Central
14	What word did she ask you to say?	Suggestive	Peripheral
15	Where on your body did you have to feel the vibrations?	Neutral	Central
16	Did you also have to put your hands on your ears?	Suggestive	Central
17	Where on your body did the lady touch you to feel the vibrations?	Suggestive	Central
18	At the end, did Ms. ____, your teacher, say that she really enjoyed participating in the activity with you?	Suggestive	Peripheral

The Anxiety Questionnaire

In order to assess anxiety in children, a standardised questionnaire, the State-Trait Anxiety Inventory for Children (STAI-C: Spielberger, Edwards, Lushene, Montuori, & Platzek, 1973), was used. It is an often used test because it distinguishes between trait anxiety and state anxiety. There is substantial evidence of internal consistency, test-retest reliability, and construct validity for both scales of the STAI-C (i.e., trait and state anxiety: Spielberger, 1973; Papay & Spielberger,

1986). Scores on the state scale have been shown to fluctuate with variation of the stress environment; it increases in more stressful conditions and decreases when one is feeling more relaxed. The trait scale is stable over time and across situations.

However, as participants were recruited in the French speaking part of Belgium a translated version of this instrument was required. Although the STAI-C is employed around the world and has been translated in many languages, there is no validated version of the children test in French (See Bruchon-Schweitzer & Paulhan, 1990; Spielberger, 1993 for the validated adult version). We therefore used the data we collected from the STAI-C to verify its structure in French (compared to its known validated structure in English). Studies examining the factor structure of the STAI-C have usually found three factors. These are trait anxiety, state anxiety-present, and state anxiety-absent. The study described below was conducted to ensure that, in our sample, the French version would yield the same factor structure.

Method

Participants

The sample consisted of 242 Year 3 and Year 4 children from two elementary schools in Belgium. There were 119 girls and 123 boys. They were aged between eight and ten years old ($M = 8.99$ years, $SD = .68$ years). All children spoke French as their first language.

Materials

Anxiety questionnaire. A French translation of Spielberger *et al.*'s (1973) STAI-C was used for this study (see appendix A). It comprised two scales of 20 items each. The first scale measured trait anxiety. The children were asked to respond to the items in relation to how they *generally* feel. They had to indicate, on a three-point Likert scale, the frequency of occurrence of the behaviour described in

the items. For example, item eight was “I am shy”. Children had to respond “hardly ever”, “sometimes” or “often”. The state anxiety scale required children to answer with the alternative that best described how they felt at that time. For example, for item one, children had to indicate whether they felt “very calm”, “calm” or “not calm”. The translation of the scales into French was carried out by the researcher and verified by a translator and several school teachers working specifically with children of similar ages as the ones who were tested. It was also compared to a translation that was kindly lent to the author by Professor Bruchon-Schweitzer of the Université de Bordeaux, France, who was also working on a validation of the French STAI-C. As both versions were virtually identical, the present one was retained.

Procedure

Individually, children completed both scales of the STAI-C. The instructions were read aloud by the experimenters who made sure they were understood by all participants. No children took more than 20 minutes to complete both scales.

Results

Internal consistency

In order to verify the internal consistency of the French version of the STAI-C, Cronbach's alpha was calculated. It showed a value of .86 which can be considered excellent (Fleiss, 1981).

Factor structure

Intercorrelations were computed for the whole sample (of 40 STAI-C items). The resulting matrix was subjected to a principal components analysis. Thirteen factors with eigenvalues greater than 1 were extracted; the first three being 6.66, 3.18, and 2.60. Examination of the scree plot (Cattell, 1966) of the eigenvalues suggested three or four major factors. In order to ensure that no meaningful solution

was overlooked, two-, three-, four-, and five-factor solutions were rotated using Varimax. In accordance with previous studies, the three-factor rotation (shown in Table 3) was the most satisfying in terms of simple structure and psychological meaningfulness.

Table 3. *Factor loadings for the French translation of the State-Trait Anxiety Inventory for Children.**

		Factor I (Trait anxiety)	Factor II (State anxiety absent)	Factor III (State anxiety present)
STAI-C Trait items				
1.	Mistakes	47	(21)	
2.	Crying	48		
3.	Unhappy	41		
4.	Making up mind	(29)		
5.	Face problems	(35)		
6.	Worry	62		
7.	Upset home	(27)		
8.	Shy	(28)		
9.	Troubled	62		
10.	Thoughts	45		
11.	Worry school	51		
12.	Deciding	41		
13.	Heart	41		(21)
14.	Afraid	55		
15.	Worry parents	63		
16.	Hands	(38)		
17.	Worry future	60		(23)
18.	Asleep	(37)		
19.	Stomach	(37)		
20.	Worry others	50		
STAI-C State items				
1.	Calm		40	
2.	Upset			53
3.	Pleasant		54	
4.	Nervous			54
5.	Jittery		(22)	55
6.	Rested		40	
7.	Scared			53
8.	Relaxed		59	
9.	Worried	(26)		59
10.	Satisfied		46	
11.	Frightened			71
12.	Happy		70	
13.	Sure	(23)	56	
14.	Good		69	(21)
15.	Troubled	(27)		59
16.	Bothered	(20)	(31)	46
17.	Nice		74	
18.	Terrified			68
19.	Mixed-up			62
20.	Cheerful		76	
Total variance		11.43	10.31	9.36

*Decimals have been omitted. The actual order of factor appearance is dependent on the total variance accounted for. The highest loadings for the non-salient items are shown in parentheses.

Thirteen of the 20 trait items clearly clustered on a single factor (i.e., trait anxiety). Items 4 (I have trouble making up my mind), 5 (It is difficult for me to face my problems), 7 (I get upset at home), 8 (I am shy), 16 (My hands get sweaty), 18 (It is hard for me to fall asleep at night), 19 (I get a funny feeling in my stomach) did not reach the limit loading of .40.

The 10 state anxiety absent items (1, 3, 6, 8, 10, 12, 13, 14, 17, and 20) loaded greater than .40 on a factor on which no other items loaded strongly. The factor was therefore labelled 'state anxiety absent'. Similarly, the 10 state anxiety present items (2, 4, 5, 7, 9, 11, 15, 16, 18, and 19) loaded greater than .40 on one factor on which no other items loaded robustly. The factor was called 'state anxiety present'.

In the four-factor solution, the first three factors were similar to the factors in the three-factor solution. The fourth factor was poorly defined with only four items loading greatly on it (i.e., trait 7: I get upset at home; state 1: I feel calm; state 3: I feel pleasant; and state 13: I feel sure). As most of these items had salient loadings on one of the other factors, the three-factor solution was retained for its more simple and meaningful structure.

Discussion

Consistent with previous studies using the English version of the test (e.g., Dorr, 1981; Hedl & Papay, 1982), the present results revealed a three-factor structure of the STAI-C. It found two distinct factors for the state anxiety scale, one for anxiety-absent and the other for anxiety-present. Furthermore, a separate factor for the trait scale clearly emerged. This solution was chosen for its simplicity of structure and psychological meaningfulness, after examination of the scree plot and different factorial solutions.

Seven items from the trait anxiety scale revealed no loadings greater than .40 on any of the factors. These results may be due to the small number of participants for such factor analysis. Typical guidelines suggest having between 10 and 20 times as many cases as variables. There were 40 variables in the French STAI-C, which would require between 400 and 800 participants. Having a more appropriate number of participants may make some results stronger. However, the fact that the three factor solution emerged with the current sample ($N = 242$) is reassuring. The present study found support for the validity of our French language translation of the STAI-C, with results showing a similar structure to the original English version.

Having therefore established that our translated version of this anxiety questionnaire was psychometrically sound and having designed meaningful interview questions, we could focus the remaining of the research on studying the effects of interviewer's nonverbal and verbal behaviours on children perceptions, anxiety level and memory accuracy.

Contributions of the Present Research

The present studies addressed some limitations of the current research on interviewer behaviours in children eyewitness studies:

- (i) *Children's perceptions of interviewer behaviours.* No study to date has examined whether children actually perceived interviewer's behavioural cues as 'supportive' or 'non-supportive'. It is argued here that there would be little point investigating the effects of supportive and non-supportive interviewer behaviours on children if children do not perceive them in this way. The present study therefore considered children's perceptions in order to verify

that behaviours we, as adult researchers, viewed as ‘supportive’ and ‘non-supportive’ were actually being perceived similarly (or not) by children.

(ii) *The mediating role of anxiety in studies of interviewer manner.* Carter, Bottoms, and Levine (1996) stated that the effects of interviewer behaviours on children’s suggestibility that they found could be mediated by the children’s anxiety level. They argued that a non-supportive interviewer would increase children’s level of anxiety which might in turn increase their susceptibility to misinformation. On the other hand, an interviewer behaving with support would diminish the anxiety felt by the child interviewees. They would then feel more confident and would be better able to resist suggestions. However, Carter *et al.* did not investigate this hypothesis. The present series of studies directly investigated the effect of supportive and non-supportive verbal and nonverbal behaviours on children’s accuracy and suggestibility and looked at the effect of children’s anxiety as a mediating factor.

(iii) *Are all interviewer behaviours equally important?* Previous research looked at the effect of interviewer behaviours as a whole (e.g., Goodman, Bottoms, Schwartz-Kenney, & Rudy, 1991; Quas, Bauer, & Boyce, 2004), qualifying interviewer behaviours as either supportive or non-supportive. However, it is possible that some aspects of an interviewer’s behaviours are more important components of ‘supportive’ behaviours than others (e.g., smiling behaviour, verbal reinforcement). Therefore, the present studies examined the effects of certain ‘supportive’ and ‘non-supportive’ nonverbal and verbal behaviours to observe their respective influence on children’s accuracy.

Statement of Aims

In summary, the aims of these studies were:

- (i) To investigate how different nonverbal and verbal interviewer behaviours are perceived by children;
- (ii) To examine the effects of children-perceived supportive and non-supportive nonverbal and verbal interviewer behaviours on children's level of anxiety during an interview;
- (iii) To observe the effects of these children-perceived behaviours on children's memory accuracy and suggestibility; and
- (iv) To examine the influence of different levels of anxiety on children's memory accuracy and to explore the possible role of anxiety as a mediator between interviewer behaviours and suggestibility.
- (v) To observe children's memory for central and peripheral information of the to-be-remembered event in 'supportive' and 'non-supportive' interviewing conditions.

CHAPTER 3: CHILDREN'S PERCEPTIONS OF INTERVIEWERS'

NONVERBAL BEHAVIOURS

Abstract

The study reported here examined how different nonverbal behaviours displayed by an interviewer were being perceived by children. Forty-two children aged eight- to ten-years-old watched video clips showing an interviewer displaying combinations of nonverbal behaviours defined in the literature as 'supportive' (e.g., smiling) and 'non-supportive' (e.g., closed body posture), and were asked to rate the interviewer in each clip on six different attributes (friendliness, strictness, helpfulness, sincerity, boredom and stress). The results showed that smiling received high ratings on the positive attributes (i.e., friendly, helpful and sincere) and fidgeting on the negative attributes (i.e., strict, bored and stressed).

As argued earlier, we have identified shortcomings in previous studies on the effects of interviewer behaviours in child eyewitness studies. Firstly, they have usually assumed that what is defined as supportive and non-supportive by adult researchers would indisputably be perceived as such by child participants. Secondly, no study has attempted to distinguish specific behaviours responsible for the positive and negative effects of interviewer manner on children's testimony. In order to address these issues, this study examined children's perceptions of several 'supportive' and 'non-supportive' nonverbal behaviours that have previously been used in interviewer manner research.

Three nonverbal behaviours and their opposites were selected on the basis of a review of the relevant literature (e.g., Almerigogna, Ost, Bull, & Akehurst, 2007; Davis & Bottoms, 2002; Goodman, Bottoms, Schwartz-Kenney, & Rudy, 1991). Two main criteria were used to select these behaviours. Firstly, the behaviours had to be forensically relevant and likely to occur naturally in a forensic interview setting. Secondly, there had to be research evidence to show that a person adopting such behaviours would be rated as being more, or less, involved in an interaction or would be perceived positively, or negatively by observers (Mehrabian, 1972).

On this basis, the nonverbal behaviours chosen were:

- (i) *Smiling*. Smiling has often been used in forensic studies with children as part of a 'supportive' interviewing style, for example, both Carter, Bottoms, & Levine (1996) and Goodman *et al.*'s (1991) studies used smiling in their 'supportive' condition and both showed a positive effect of the supportive interviewer on children's resistance to suggestibility. Communication studies have demonstrated that smiling affects the way others are perceived and

judged (Deutsch, 1990). For example, Rotenberg, Eisenberg, Cumming, Smith, Singh, and Terlicher (2003) found that children perceived a smiling adult as being more trustworthy and likeable than an adult who did not smile. Forensically speaking, this is important because trust is seen as a necessary component to build good rapport in an interview (Roberts, Lamb, & Sternberg, 2004). It is therefore likely that children will react differently towards an adult who appears trustworthy, compared to an adult who does not.

(ii) *Body posture.* Nonverbal communication studies have demonstrated that people sitting with a closed body posture (i.e., arms and legs crossed) tend to be judged by adult observers as being more cold, rejecting and passive than people sitting with an open body posture (Machotka, 1965). Furthermore, open body posture is associated with higher ratings of mutual understanding and involvement with another person and, thus, is important in establishing rapport (Tickle-Degnen & Rosenthal, 1990; see also Davies, & Westcott, 1999). In their recent study, Quas and Lench (2007) included body posture among other behaviours (e.g., smiling, eye contact, and verbal feedback) in their experimental conditions. The results of their interviewer behaviours manipulation demonstrated that children showing increased heart rate at retrieval and interviewed by the low support adult (i.e., closed body posture, not smiling, etc.), had poorer memory than children in the high support condition (i.e., open body posture, smiling, etc.). However, as this study looked at combinations of both verbal and nonverbal behaviours, the salience to children of body posture alone is not known.

(iii) *Fidgeting*. Although this behaviour has seldom been investigated in interviewer manner studies with either adults or children, research has demonstrated that it often occurs in interactions and can have significant effects on observers' judgements and reactions. For example, Reece and Whitman (1962) showed that a fidgeting person was perceived as cold and indifferent by adult participants, who also tended to interact significantly less with the fidgeting individual than with one who was not fidgeting. To our knowledge, no study has looked at children's perceptions of an adult's fidgeting behaviour. However, as an interviewer may perhaps unconsciously be fidgeting during the questioning of a child, we thought it important to include this nonverbal behaviour and observe its possible effects on children's impression formation and on their engagement with the interview procedure.

The aim of this study was to investigate children's perceptions of different nonverbal behaviours which have previously been defined in the literature as either 'supportive' or 'non-supportive'. Children viewed video clips showing an interviewer adopting different combinations of the three nonverbal behaviours described above. After each clip, they answered six questions regarding their perceptions of the interviewer (e.g., whether they found him friendly or not). These ratings were then analyzed to determine the impact of 'supportive' and 'non-supportive' behaviours on children's perceptions of the interviewer. It was predicted that 'supportive' behaviours would be rated by children more positively than 'non-supportive' ones.

Participants

Forty-two children participated in this study, 26 girls (8-yrs-old: 7, 9-yrs-old: 10, 10-yrs-old: 9) and 16 boys (8-yrs-old: 5, 9-yrs-old: 6, 10-yrs-old: 5) aged eight- to ten-years-old ($M = 9.05$ years, $SD = 0.79$ years). The children came from two classrooms of the same school serving a largely middle-class demographic.

Materials

Clips. The three nonverbal behaviours chosen for the clips were: (i) smiling or not smiling; (ii) closed or open body posture (i.e., arms and legs crossed or not); and (iii) fidgeting or not fidgeting (i.e., tapping hand and foot or not). These behaviours were mixed so as to give eight different possible combinations (see Table 4 for the eight combinations).

Table 4. *The eight combinations of nonverbal behaviours used in the video clips.*

	Facial expression	Body posture	Body movement
1	Smiling	Open	Not fidgeting
2	Smiling	Open	Fidgeting
3	Smiling	Closed	Not fidgeting
4	Smiling	Closed	Fidgeting
5	Not smiling	Open	Not fidgeting
6	Not smiling	Open	Fidgeting
7	Not smiling	Closed	Not fidgeting
8	Not smiling	Closed	Fidgeting

Each combination was filmed four times on four different occasions and the clips were filmed in different orders, resulting in thirty-two clips being filmed in total. The reason for filming each portrayal four times and in different orders was to avoid possible idiosyncrasies that would be unique to one particular clip and which

could influence the results. Each clip lasted about one minute. In order to control for possible order effects, the clips were randomly grouped in four series of eight so that each group saw one example of each type of behaviour combination but in different order. The clips showed a male actor (the interviewer) sitting and talking to an unseen young person. The same actor appeared in all videos. In all the clips, the actor followed a script based on an extract from the beginning of a typical forensic interview (e.g., I'm going to ask you a few questions. If you don't know the answer, just tell me...). The actor followed an identical script for all of the video clips, regardless of the behaviours he was asked to display. The topic of the interviewer's text was a visit to a museum. The young person was out of shot and did not speak at any point. It was ensured that the tone of voice of the interviewer remained as neutral as possible and as similar as possible throughout all the clips. The actor was blind to the aims of the study.

Questionnaire booklet. A questionnaire booklet was compiled for this study. It asked children for their age and gender, followed by eight sheets, each with six questions to be answered for each of the eight clips they saw. The six questions measured six different traits of the interviewer (i.e., friendliness, strictness, sincerity, helpfulness, boredom and stress). The questionnaire was based on similar ones used in previous studies of perception and impression formation (e.g., Brooks, Church, & Fraser, 1986; Thomas, Skitka, Christen, & Jurgena, 2002). Children responded to each perception question by circling a response between one and five - where a score of one meant 'not at all' (e.g., I found the interviewer not at all friendly) and a score of five meant 'very' (e.g., I found the interviewer very friendly) (see Appendix B for a copy the questionnaire).

Procedure

Four groups, each consisting of eight to twelve children, watched the video clips. Each child received a questionnaire booklet and was asked to write down their age and gender. The group was then told that they would be watching clips of an interviewer and that they would have to answer questions about him afterwards. The first clip was then shown after which participants were asked to read the questions for the first clip and rate the interviewer on the six dimensions (i.e., friendliness, strictness, sincerity, helpfulness, boredom and stress).

Children were encouraged to ask the experimenter if there was anything they did not understand. All of the questions asked by the children were of practical nature such as “I put a cross in the wrong box, what should I do?”, “Is it okay if I circle the answer rather than put a cross?”, and “Can I turn the page?” When all children were finished, the second clip was shown and so on for all eight clips. The watching and rating task took between 15 and 20 minutes for each group. The entire sample was tested over the course of a single day. The testing took place in an unused classroom within the school.

Results

Relationships between the six different perception attributes

As shown in Table 5, children’s ratings of the positive attributes (i.e., friendliness, helpfulness and sincerity) were positively correlated with each other, as were the negative attributes (i.e., strictness, boredom and stress). Furthermore, none of the positive and negative traits are positively correlated with each other.

Table 5. *Mean correlations between children's ratings for the six perceptions measures¹.*

	Friendliness	Helpfulness	Sincerity	Strictness	Boredom	Stress
Friendliness	~	0.51	0.41	-0.26	-0.32	-0.23
Helpfulness		~	0.38	-0.07	-0.29	-0.26
Sincerity			~	-0.01	-0.20	-0.26
Strictness				~	0.28	0.25
Boredom					~	0.45
Stress						~

The effects of interviewer nonverbal behaviours on children's perceptions

Table 6 shows the mean ratings for the perception measures as a function of whether the interviewer was displaying 'supportive' or 'non-supportive' behaviours. Due to problems of independence (i.e., each child saw eight separate clips), it was not appropriate to run multivariate analyses of variance. Instead, descriptive statistics for each interviewer behaviour were generated by averaging participants' perception scores across the four different clips in which that behaviour was displayed (e.g., participants saw four clips in which the interviewer was smiling, and four clips in which he was not). The mean ratings for the supportive behaviours were calculated and compared to the mean ratings for the non-supportive behaviours. In this way it was possible to ascertain, in a purely descriptive manner, the extent to which supportive and non-supportive behaviours were rated as suggesting positive (e.g., friendly, helpful and sincere) or negative (e.g., strict, bored, stressed) traits of the interviewer.

¹ Due to problems with independence, it was not appropriate to calculate statistical significance for these correlations. The mean correlations are presented here as purely descriptive data to demonstrate that traits which should be related conceptually (e.g., positive and negative traits) were indeed rated in the same direction. The correlation matrices for each clip can be found in Appendix G.

Table 6. Means of children's perception ratings for the nonverbal behaviours (standard deviations in parentheses).

	Supportive behaviours			Mean score for supportive behaviours	Non-supportive behaviours			Mean score for the non- supportive behaviours
	Smiling	Open body posture	No fidgeting		Not smiling	Closed body posture	Fidgeting	
Friendly	4.11 (.83)	3.88 (.92)	3.77 (1.06)	3.92	3.50 (1.09)	3.69 (1.10)	3.81 (.98)	3.66
Helpful	3.54 (1.13)	3.40 (1.14)	3.42 (1.12)	3.45	3.22 (1.18)	3.34 (1.20)	3.33 (1.20)	3.30
Sincere	3.56 (1.10)	3.44 (1.13)	3.49 (1.08)	3.50	3.31 (1.14)	3.42 (1.13)	3.38 (1.16)	3.37
Strict	2.59 (1.21)	2.78 (1.23)	2.67 (1.23)	2.68	3.18 (1.23)	3.02 (1.26)	3.08 (1.24)	3.09
Bored	2.92 (1.30)	3.14 (1.26)	2.79 (1.26)	2.95	3.39 (1.29)	3.19 (1.36)	3.47 (1.28)	3.35
Stressed	2.96 (1.33)	3.03 (1.31)	2.48 (1.21)	2.82	3.16 (1.28)	3.10 (1.30)	3.53 (1.19)	3.26

As shown in Table 6 in bold font, the interviewer was rated consistently higher on the positive traits (i.e., friendly, helpful and sincere) when he was adopting the supportive behaviours. When he was adopting the non-supportive behaviours, he was rated consistently higher on the negative traits (i.e., strict, bored and stressed). The table also shows that, across the two behaviours, there was not much difference between the means of perception ratings as a function of body posture.

Discussion

The results of this study showed that the interviewer was rated more positively when adopting 'supportive' behaviours (e.g., smiling) then when adopting 'non-supportive' behaviours (e.g., fidgeting). This is in accordance with previous studies which have found a positive effect of smiling (Otta, Abrosio, & Hoshino, 1996) and a negative effect of fidgeting (Rockwell & Hubbard, 1999) on people's perceptions. The study also demonstrated that differences in body posture alone (i.e., open vs. closed) did not appear to be particularly salient in children's ratings of the

interviewer. Although forensically speaking this is quite surprising, in a previous study with children, Neil (1989) showed that teacher's body posture had very little influence on children's perceptions. The present results may also be due to the static nature of our body postures. Although the open and closed body postures differed by the positions of the arms and legs of the interviewer, their immobility may have appeared too unnatural to investigate their influence on observers' perception ratings. The results may also suggest that the difference between open and closed body postures might be less salient for children's impression formation than the difference between a smiling and a non-smiling person (Grahe & Bernieri, 1999).

Therefore, following these results, and on the basis of the existing literature, smiling and fidgeting were chosen for a subsequent study in which we tested the effects that these behaviours might have on children's ability to recall accurately details of a naturalistic event when they were questioned about that event both appropriately (with neutral questions) and inappropriately (with misleading questions).

CHAPTER 4: THE EFFECTS OF INTERVIEWERS' NONVERBAL BEHAVIOURS ON CHILDREN'S TESTIMONY

Abstract

The study reported here investigated the impact of the smiling and fidgeting behaviours (see chapter 3) on children's memory accuracy, suggestibility, and anxiety level. Eighty-six children aged between eight- and ten-year-old participated in a learning activity about the vocal chords. One week later, they were individually interviewed about the activity by an interviewer adopting either the 'supportive' (i.e., smiling) or the 'non-supportive' (i.e., fidgeting) nonverbal behaviour. Children interviewed by the non-supportive interviewer were less accurate, more suggestible, and were more likely to falsely report having been touched, than those interviewed by the supportive interviewer. Children interviewed by the supportive interviewer were also more likely to say that they did not know an answer than those interviewed by the non-supportive interviewer. Participants in both conditions gave more correct answers to questions about central, as opposed to peripheral, details of the activity. Finally, children interviewed by the non-supportive interviewer reported feeling more anxious due to the interviewing than children in the supportive condition.

The aim of this study was to examine the effect of children-perceived supportive and non-supportive nonverbal behaviors on children's accuracy and resistance to misleading questions. The children took part in a learning activity about the vocal chords. One week later, they were individually interviewed about this event by an interviewer adopting either the 'supportive' (i.e., smiling) or the 'non-supportive' behavior (i.e., fidgeting). The children were asked a series of questions, some of which were neutral and some of which were misleading. Children's levels of state and trait anxiety levels were also measured.

In line with previous research (e.g., Almerigogna *et al.*, 2007; Carter *et al.*, 1996; Davis & Bottoms, 2002), it was predicted that children in the non-supportive condition would show less resistance to the suggestive questions than those in the supportive condition. Previous studies have showed that information about central details of an event is usually more easily accessible than information about peripheral details (Ibabe & Sporer, 2004). Central details also tend to be more difficult to mislead on than peripheral ones (Christianson & Loftus, 1991). The interview questions used in this study were also designed so as to have some questions referring to central information of the activity and some to peripheral details. In line with previous studies (e.g., Candel, Merckelbach, Jelicic, Limpens, & Widdershoven, 2004; Wright & Stroud, 1998), we predicted that children would respond more accurately to questions about central details of the learning activity than those referring to peripheral details. One question asked children whether the adult had touched them during the learning activity. As adult touches have been the focus of previous work (e.g., Krackow & Lynn, 2003; Tobey & Goodman, 1992) and are often of significance to forensic investigations, we explored whether children's responses to this item would be affected by interviewer manner. Specifically, we

predicted that children interviewed by the non-supportive interviewer would be more likely to report this erroneous event than children in the supportive condition. Finally, we predicted that children in the supportive condition would feel less anxious than children in the non-supportive condition and we examined the possible role of anxiety as mediator between interviewer behaviour and children's accuracy.

Method

Participants

Eighty-six children - 43 girls (8-yrs-old: 16, 9-yrs-old: 24, 10-yrs-old: 3) and 43 boys (8-yrs-old: 10, 9-yrs-old: 25, 10-yrs-old: 8) - , aged between eight- and ten-years-old ($M = 8.99$ years, $SD = 0.63$ years) participated in this study. The participants were all pupils from the same primary school, in a largely middle-class area, and came from four different classrooms. They all spoke French as their first language. None of the children who participated in the previous experiments took part in this one. Girls and boys were equally distributed across the conditions.

Materials

Event. A learning activity was designed in order that the children participated in small groups in the event they were to be questioned about later. A speech therapist, who was blind to the aims of the experiment, taught the children about the vocal chords. She explained what vocal chords were, where they could be found and showed the children what they looked like by drawing three sketches on a board representing the vocal chords at rest, while inhaling and when sick. She then explained how the vocal chords worked, making sounds as examples. She asked the children to make the sounds 'aaaah', 'eeee' and 'rrrr' with her and to feel on their own chest and throat the vibrations of the sounds they were making. She then

thanked the children for their time and reminded them to take good care of their voice. The event lasted about 10 minutes.

Anxiety questionnaire. The questionnaire used to measure trait and state anxiety was the French language translation of Spielberger, Edwards, Lushene, Montuori, and Platzek's (1973) State-Trait Anxiety Inventory for Children (STAI-C) reported in Chapter 2. It comprised 40 items printed on two sheets. The first part of the questionnaire consisted of 20 items designed to measure children's trait anxiety. It included statements such as "I am shy", "I notice my heart beats fast" and "I worry about what others think of me". These items were responded to by indicating 'hardly-ever', 'sometimes' or 'often'. The other 20 items measured their state anxiety with statements like "I feel very calm, calm or not calm", "I feel very nervous, nervous or not nervous" and "I feel very terrified, terrified or not terrified". The instructions were written on top of the questionnaire. The same questionnaire was handed out to all participants.

Interviewer manner manipulation. Supportive or non-supportive interviewer behaviours were operationalised in line with the findings of the study reported in Chapter 3. Thus, in the supportive interviews, the interviewer was smiling and avoided fidgeting behaviours whereas in the non-supportive interviews, the interviewer was not smiling and was fidgeting (i.e., tapping hand and foot). It was ensured that the tone of voice and the manner in which the interviewer was dressed remained constant throughout all interviews and across conditions. The same female interviewer (blind to the aim of the study) conducted all the interviews which all took place in the same room at the school. It was not the same interviewer as pictured in the clips for the experiment reported in Chapter 3.

Structure of the interview and interview questions. At the beginning of the interview, the interviewer explained what the interview would be about.

“Let me tell you why we’re both here today. I would like to know what happened last week when you participated in that learning activity. Do you remember? Well, I’m just going to ask you a few questions, is that ok? If I ask you a question and you don’t know the answer that’s fine, just tell me that you don’t know. Remember that I wasn’t there, I don’t know what happened so don’t be afraid to say everything you can remember even if you think it’s silly or not important ok? ”

During the interview, children were asked 18 questions about the learning activity in which they participated. The questions were asked in the same temporal order in which they occurred in the event. Five of the questions were neutral and 13 contained some form of misinformation (the list of interview questions can be seen in Table 2 in Chapter 2). Furthermore, three of the neutral questions and seven of the suggestive questions referred to central details of the learning activity; and two neutral questions and six suggestive questions concerned peripheral details of the activity. Developmentally appropriate language was used and recommended instructions were given at the start of the interview, such as the acceptability to say “I don’t know” when needed.

Procedure

In groups of four, children participated in a learning activity about the vocal chords. The event lasted about ten minutes for each group. One week later, children were individually interviewed following the structure detailed above. Interviews lasted between 10 and 15 minutes and took place at the children’s school, in a room adjacent to their classroom. Children’s answers to the interview questions were recorded by the interviewer. All answers were short in length, so the interviewer was

easily able to accurately record them by hand during the interviews. Children were then thanked for their participation and returned to their normal class activities.

Coding and measures

An accuracy score was calculated by adding up the number of correct answers to the questions for each child. The answers were coded as either 'accurate' if the answer was judged as correct, 'inaccurate' if the answer was incorrect or as "don't know" if the child stated that he or she did not know the answer. For example, on the suggestive question "That bump some people have in their throat, it has the name of a vegetable. What is it called?" answers such as "she didn't talk about a vegetable" or "an apple" was judged as accurate, whereas answers such as "a potato" or "a corn" were judged as inaccurate. Children's answers on the interviewer's coding sheets were coded by the first author and by a second coder who was blind to the aim of the experimental conditions. Cohen's Kappa was .92 which, according to Fleiss (1981), can be considered excellent agreement. Any disagreements were resolved by discussion between the two coders.

The number of accurate answers for each type of question (i.e., neutral central, neutral peripheral, suggestive central, and suggestive peripheral) were then computed. As the number of questions was uneven for each type, responses were recoded into proportions ranging from 0 to 1. This was done by dividing the total number of accurate responses to each type of question (e.g., neutral central, suggestive central) by the number of questions in each category. For example, scores for the suggestive central questions were divided by seven as there were seven suggestive central questions. The "I don't know" answers were excluded from the accuracy scores and the overall proportion of times children answered with "I don't

know” was recorded separately. The STAI-C measures were calculated following the test’s instructions (Spielberger *et al.*, 1973).

Results

Interviewing style manipulation check

The state anxiety measures were used to check the effects of the different nonverbal interviewer behaviours on children. As shown in Table 7, children interviewed in a supportive manner became significantly less anxious pre- to post-interview ($t_{42} = 7.29, p < .01$) whereas children interviewed by the non-supportive interviewer became significantly more anxious ($t_{42} = -9.47, p < .01$). Table 7 also showed that there was no difference in trait anxiety between the supportive and the non-supportive group ($t_{84} = .09, n.s.$).

Table 7. Means for trait anxiety, and pre- and post-interview state anxiety for the supportive and non-supportive interviewing style groups (standard deviations in parentheses).

	Trait anxiety	Pre-interview state anxiety	Post-interview state anxiety	State anxiety mean differences
Supportive	35.09 (5.53)	31.65 (5.49)	28.35 (4.31)	3.30 (2.97)
Non-supportive	34.98 (6.02)	28.51 (5.16)	32.65 (4.81)	-4.14 (2.87)

Effect of interviewing style, question type and question detail on children's accuracy

Initial analysis revealed that overall children were quite accurate. Across all conditions and questions, the mean proportion accuracy score was .61 (SD = .30). Means and standard deviations for the proportions of accurate, inaccurate, and “don’t know” answers are showed in Table 8 which shows that taken as a whole children gave more erroneous answers when interviewed by the non-supportive interviewer than when interviewed by the supportive one. Children in the supportive condition were more likely to say that they did not know an answer than those in the non-

supportive group. Non-parametric testing of the “don’t know” answers confirmed this ($U = 287$, $z = -5.65$, $p < .001$).

Table 8. Means of the proportion of accurate, inaccurate, and “don’t know” answers (standard deviations in parentheses).

	Supportive	Non-supportive
Proportion of accurate answers	0.68 (0.15)	0.53 (0.15)
Proportion of inaccurate answers	0.17 (0.10)	0.43 (0.15)
Proportion of “don’t know” answers	0.15 (0.09)	0.04 (0.07)

A preliminary 2 (supportive vs. non-supportive) x 2 (suggestive vs. neutral question) x 2 (central vs. peripheral detail) x 3 (age 8 vs. age 9 vs. age 10) x 2 (male vs. female) mixed model ANOVA analysis was then conducted on the accuracy scores. However, as there were no main effects and no interactions for either age or gender, these two factors were excluded from the main analysis reported here. Therefore, a 2 (interviewing style: supportive; non-supportive) x 2 (question type: neutral; suggestible) x 2 (question detail: central; peripheral) mixed model ANOVA was carried out on the proportions scores of accurate answers. Interviewing style was a between-subjects variable, and question type and question detail were both within-subjects variables.

The results demonstrated that children gave more accurate answers when questioned by the supportive interviewer ($M = .69$, $SD = .30$) than when interviewed by the non-supportive interviewer ($M = .52$, $SD = .28$) ($F_{1, 84} = 25.73$, $p < .001$, $\text{partial } \eta^2 = .23$). They gave more accurate answers to suggestive questions ($M = .68$, $SD = .20$) than to neutral questions ($M = .53$, $SD = .36$) ($F_{1, 84} = 22.26$, $p < .001$, $\text{partial } \eta^2 = .21$). These main effects were qualified by a significant interaction

between interviewer style and question type ($F_{1, 84} = 10.48, p = .002, \text{partial } \eta^2 = .11$). As shown in Figure 1, children were more resistant to the misinformation of the suggestive questions when interviewed by the supportive interviewer compared to the non-supportive interviewer, but their answers to the neutral questions did not differ as a function of whether the interviewer behaved in a supportive or non-supportive manner.

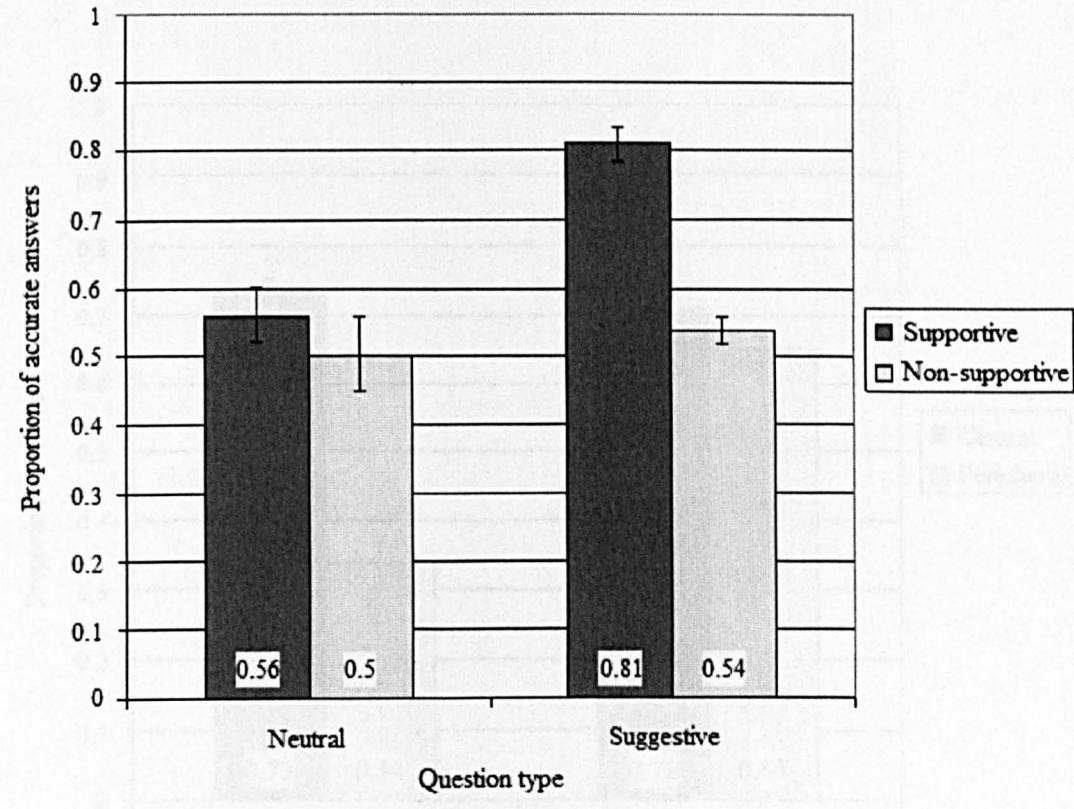


Figure 1. *Proportion of accurate answers as a function of interviewing style and question type (with standard error bars).*

There was also a main effect of question detail, with children providing more accurate answers to questions about central details ($M = .72, SD = .25$) than to questions about peripheral details ($M = .49, SD = .31$) ($F_{1, 84} = 136.10, p < .001, \text{partial } \eta^2 = .62$). Again, however, this was qualified by a significant interaction

between question type (neutral vs. suggestive) and question detail (central vs. peripheral) ($F_{1, 84} = 67.84, p < .001, \text{partial } \eta^2 = .45$). Figure 2 shows that neutral or suggestive questioning did not impact children’s accuracy in relation to central details of the event, but questioning did affect their accuracy in relation to peripheral details. Children were more accurate when questioned about peripheral details in a suggestive compared to a neutral manner. All other interactions were non-significant.

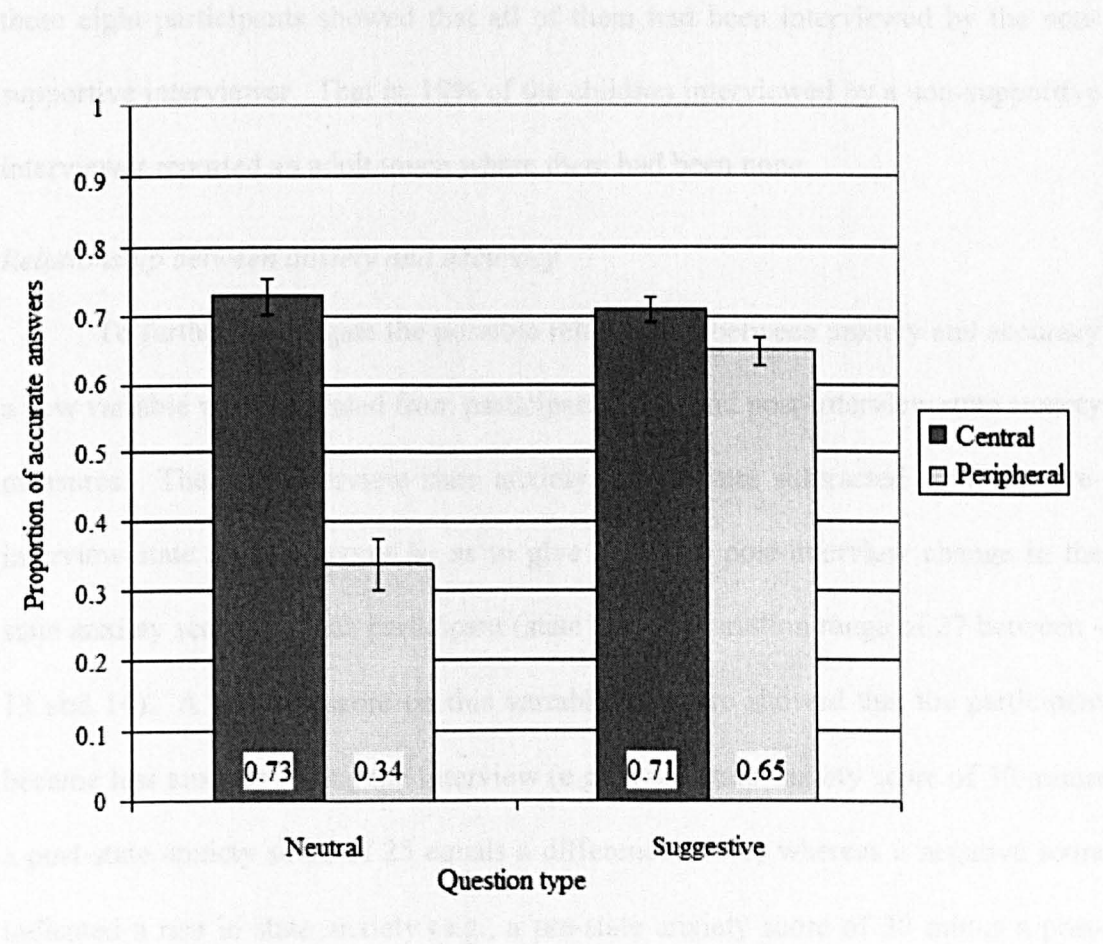


Figure 2. Proportion of accurate answers as a function of question type and question details (with standard error bars).

Frequencies were observed out to examine the extent to which children were likely to incorrectly report that they had been touched by the confederate during the learning event. One of the questions in the interview (question 17) asked children "Where on your body did the lady touch you to feel the vibrations?" when, in fact, no touch had occurred. Of the 86 participants, only eight (9%) falsely reported having been touched by the confederate during the learning activity. Closer examination of these eight participants showed that all of them had been interviewed by the non-supportive interviewer. That is, 19% of the children interviewed by a non-supportive interviewer reported an adult touch where there had been none.

Relationship between anxiety and accuracy

To further investigate the possible relationship between anxiety and accuracy a new variable was calculated from participants' pre- and post-interview state anxiety measures. The post-interview state anxiety scores were subtracted from the pre-interview state anxiety scores so as to give a pre- to post-interview change in the state anxiety scores of each participant (state anxiety variation range of 27 between -13 and 14). A positive score on this variable therefore showed that the participant became less anxious during the interview (e.g., a pre-state anxiety score of 30 minus a post-state anxiety score of 25 equals a difference of +5) whereas a negative score indicated a rise in state anxiety (e.g., a pre-state anxiety score of 30 minus a post-state anxiety score of 35 equals a difference of -5). Correlations between children's state anxiety variation and accuracy proportions for both neutral and suggestive questions demonstrated that there was no relationship between state anxiety variations and the number of accurate answers to neutral questions ($r = .17$, n.s.), but there was a significant relationship between state anxiety and the number of correct

answers to suggestive questions ($r = .66, p < .001$) (see Figure 3 for the scatterplot). Children reporting feeling less anxious after the interview than before were more resistant to the suggestions of the misleading questions than children feeling more anxious post- than pre-interview. Trait anxiety did not relate to either accurate responses to neutral questions ($r = -.01, \text{n.s.}$) or to suggestibility proportions ($r = .10, \text{n.s.}$).

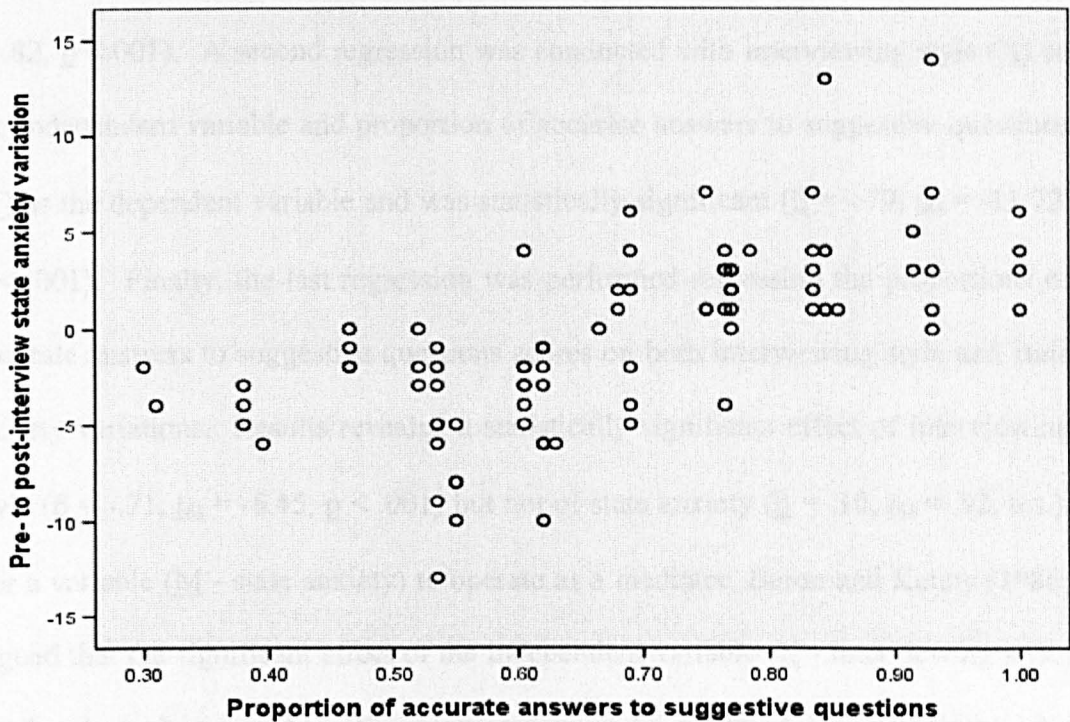


Figure 3. Scatterplot of the correlation between state anxiety variation and proportion of accurate answers to suggestive questions.

Anxiety as mediator between interviewer behaviours and resistance to suggestive questions

A mediational analysis was carried out to verify if, in the present study, state anxiety could be acting as a mediator between interviewing style and suggestibility.

A mediational model states that a variable X (the independent variable, i.e., interviewing style) influences a variable Y (the dependent variable, i.e., proportion of accurate answers to suggestive questions) through a variable M (the mediating variable, i.e., state anxiety). Following Baron and Kenny's (1986) guidelines for determining mediation, three regression equations were created. The first regression was performed to check the effect of interviewing style on state anxiety variations (the influence of X on M). The results were statistically significant ($\beta = -.79$, $t_{84} = -11.82$, $p < .001$). A second regression was conducted with interviewing style (X) as the independent variable and proportion of accurate answers to suggestive questions (Y) as the dependent variable and was statistically significant ($\beta = -.79$, $t_{84} = -11.72$, $p < .001$). Finally, the last regression was performed regressing the proportions of accurate answers to suggestive questions scores on both interviewing style and state anxiety variations. Results revealed a statistically significant effect of interviewing style ($\beta = -.71$, $t_{83} = -6.45$, $p < .001$) but not of state anxiety ($\beta = .10$, $t_{83} = .92$, n.s.). For a variable (M - state anxiety) to operate as a mediator, Baron and Kenny (1986) argued that the significant effect of the independent variable (X - interviewing style) on the dependent variable (Y - accuracy) must be rendered non-significant after having controlled for M. This was not the case here indicating that in the present study state anxiety did not act as a mediator between interviewing style and resistance on the suggestive questions.

Discussion

The aim of this study was to examine the impact of children-perceived supportive and non-supportive interviewer nonverbal behaviours on children's eyewitness testimony. The results showed that overall children were quite resistant to suggestions as they provided high numbers of accurate answers to misleading

questions. Despite this, the two different interviewing styles had a significant effect on children's accuracy. As predicted, children interviewed by the interviewer displaying the non-supportive nonverbal behaviour (i.e., fidgeting) were significantly less resistant to the misleading questions than children interviewed by the supportive (i.e., smiling) interviewer. There was no difference between the two conditions in terms of correct answers to neutral questions. There also was an effect of question detail with children giving more correct answers to questions about central details than to questions referring to peripheral details of the event, which supported the hypothesis. Questions about peripheral details also received more accurate answers when asked in a suggestive manner than when asked in a neutral manner. The results showed an effect of interviewer manner on children's tendency to answer "I don't know", with children interviewed by the supportive interviewer saying that they did not know an answer more often than children questioned by the non-supportive interviewer. Furthermore, in line with the prediction, there was a clear effect of interviewing style on children's tendency to incorrectly report that they had been touched during the learning activity with all eight children who falsely reported such touch interviewed by the non-supportive interviewer. Finally, although an effect of interviewing style on children's state anxiety level was observed (as expected children interviewed by the non-supportive interviewer reported feeling more anxious and those interviewed by the supportive interviewer felt less anxious after the interview than before), state anxiety was not acting as a mediator between interviewing style and suggestibility in the present experiment.

Although the study was designed to investigate children's accuracy as a function of interviewers' nonverbal behaviours, the results in each condition may have been confounded by the absence of the opposite behaviour. For example,

children in the non-supportive group showed less resistance to suggestive questions. Was this due to the interviewer's fidgeting behaviour, or could it be due to the fact that the interviewer was not smiling? Similarly the positive effects demonstrated by the smiling interviewer may be affected by the non-fidgeting manner. Children's perception ratings from Chapter 3 give us hope that this was not a confounding variable, as children rated the interviewer more negatively when he was *not smiling and fidgeting*, than when he was *smiling and not fidgeting*. However, in order to conclusively resolve this question, future research should include two additional interviewing conditions (i.e., smiling/fidgeting and not smiling/not fidgeting) to complete the experimental design and control for any potential confounding effects.

Having examined the effects of an interviewer's nonverbal behaviours, the next chapters looked at the influence an interviewer's verbal behaviours on children's perceptions and testimony.

CHAPTER 5: CHILDREN'S PERCEPTIONS OF INTERVIEWERS' VERBAL BEHAVIOURS

Abstract

The studies reported in the present chapter examined the effects of interviewer's verbal behaviours on children's perceptions of the interviewer (e.g., whether the interviewer is seen as friendly, supportive). For the first study, 44 eight- to ten-year-old children watched video clips showing an interviewer displaying combinations of various verbal behaviours which have been identified in the literature as 'supportive' (e.g., positive reinforcement) and 'non-supportive' (e.g., verbal coercion) behaviours. For each clip, they were asked to rate the interviewer on six dimensions: Friendliness, strictness, helpfulness, sincerity, boredom and stress. Although the results showed that verbal coercion made the greatest impression on children's perceptions, a follow-up study was carried out in order to verify the possible effects of verbal reinforcement. Analysis demonstrated that an interviewer who provided several positive reinforcements (e.g., you're doing great; you're really helping us) was perceived by participants significantly more positively than an interviewer adopting negative verbal reinforcement (e.g., come on, hurry up; you can do better).

Several studies have now highlighted the role of interviewers' behaviours in forensic interviews both with adults and children (e.g., Almerigogna *et al.*, 2007; Bain & Baxter, 2000; Davis & Bottoms, 2002). The methods of these studies usually consist of interviewing participants about an event they previously watched, heard or participated in by either a 'supportive' interviewer or a 'non-supportive' interviewer. In these experiments, supportive interviewers behave and speak in a warm manner. They maintain eye contact, smile frequently, sit in an open body posture and retain a friendly tone of voice throughout the interview. On the contrary, non-supportive interviewers tend to act in a cold manner, avoiding eye contact, smiles and encouragements, and maintain a physical and psychological distance with the interviewees. Results from these studies have shown that being interviewed by a supportive interviewer reduces the suggestibility of child interviewees (Bottoms, Quas, & Davis, in press). Importantly, being interviewed by a supportive interviewer has not been shown to impact negatively the memory accuracy of child witnesses. Carter, Bottoms, and Levine (1996) argued that the beneficial effects of being interviewed by a supportive interviewer come from the supportive interviewer decreasing interviewees' state anxiety. Feeling less anxious, interviewees are then more comfortable and assertive. Therefore, with a supportive interviewer, interviewees may feel more confident in their abilities, at better ease to disagree with an interviewer's erroneous statements and have more resources available to conduct a thorough memory search (Quas, Wallin, Papini, Lench, & Scullin, 2005).

Although the importance of interviewers' behaviours during an interview is now recognised, no study has attempted to dismantle these behaviours to examine the influence of specific behaviours on interviewees' memory reports. Having

investigated supportive and non-supportive nonverbal behaviours in the preceding chapters, the focus of the following chapters concerned the effects of interviewer's verbal behaviours. Verbal behaviour here refers to the content of the speech rather than to its vocal, paralinguistic, component (e.g., speech rate and pitch range). A literature review was undertaken and the three following verbal behaviours were selected as being the most appropriate ones to test in these studies:

- (i) *Verbal coercion.* Verbal coercion involves applying techniques which will intimidate and pressurise the interviewees to report more than they actually remember. For example, interviewers may tell the interviewees that they already have received information from other witnesses regarding the subject matter under investigation. Such practice tends to lead some interviewees to conform to whatever others have supposedly said (Ettinger, Crooks, & Stein, 1994). Verbal coercion is undesirable in interviews with children because they tend to adjust their own behaviours and testimonies to be as consistent with that of others as possible. For example, in a study by Garven, Wood, Malpass, and Shaw (1998), three- to six-year-old children who were interviewed about an event using different forms of verbal coercion were substantially more likely to make false accusations towards an adult than children who were interviewed using only suggestive questions. Verbal coercion puts child interviewees in a delicate situation. They can either choose to conform, repeat the same information others have allegedly given and thus report what the interviewer wants to hear, or tell the truth and contradict both interviewer and others; an action which, for a child, demands a great amount of self-confidence to accomplish. Child interviewees may also be aware that, by contradicting others, they might face negative

consequences, such as less support from the interviewers or longer interviews (Leichtman & Ceci, 1995). It therefore seems that verbal coercion has mainly negative effects on children's testimonies in forensic interviews.

Examples of verbal coercion:

Coercion: I know what happened; your friend has already told me everything;
just say what they told me.

Equivalent neutral/positive statements: I don't know what happened; I wasn't there; there's no right or wrong answer.

- (ii) *Verbal reinforcement.* Reinforcements given during a forensic interview are a difficult subject to research as both positive and negative reinforcements have been viewed with criticism (Schreiber, Bellah, Martinez, McLaurin, Strok, Garven, & Wood, 2006). Positive verbal reinforcements involve praising or rewarding interviewees. They can suggest to interviewees that they would be demonstrating enviable qualities like intelligence or cooperation by giving a desired answer. Negative verbal reinforcements consist of giving negative feedback for failing to say what the interviewers want. Interviewers may criticise or dispute interviewees' testimony or point out that it is incomplete or unsatisfactory (Ettinger, Crooks, & Stein, 1994). Psychologists have long recognised that reinforcement can greatly influence interviewees' behaviour (Ofshe, 1989). A study by Kassin (1997) examined the effect of reinforcements on false statements by adults. The study demonstrated that false confessions may sometimes be elicited when interviewers promise, explicitly or not, that a confession will bring a more lenient punishment or that a refusal to confess will lead to a more severe sentence. Research has also shown that, when used in interviews with children, reinforcement can be

a very effective form of suggestiveness (Tharp & Wetzel, 1969). For example, Garven, Wood, and Malpass (2000) demonstrated that five- to seven-year-old children who received moderate forms of reinforcement were more likely to falsely testify that an adult inappropriately touched them than children who did not receive such reinforcements. Although the potential undesirable effects of negative reinforcements are obvious, as stated, positive encouragements may also be problematic (Gilboa & Greenbaum, 1978). For example, Biederman, Davey, Rider, and Franchi (1994) showed that giving positive verbal reinforcements to developmentally delayed four- to ten-year-old children actually decreased their performance on various tasks.

Examples of verbal reinforcement:

Positive: You're doing great; you've got a great memory; you're helping us a lot; you're very intelligent.

Negative: You can do better; you should remember; that's not right; what good are you?; you're not helping us at all.

(iii) *Verbal filler.* Despite their frequency in conversational talk, very little is known about verbal fillers and how they can affect listeners (Clark & Fox Tree, 2002). One hypothesis is that positive verbal fillers might encourage children to speak, whereas negative verbal fillers might destabilise them (Krasner, 1958). Bortfeld, Leon, Bloom, Schober, and Brennan (2001) argued that verbal fillers may serve a communicative function. They may provide information that allows two persons in a conversation to better coordinate interaction and manage turn-taking. On the negative side, verbal fillers may distract listeners from the conversation and make the speakers sound unsure

(Brennan & Schober, 2001). However, nothing is known about the effects of verbal fillers in forensic interviews with children.

Examples of verbal filler:

Positive: Uh-huh; right; yes.

Negative: Oh; sigh; um.

As the studies reported in this thesis relate to the questioning of child witnesses, the verbal behaviours that were examined had to be forensically relevant. Prior reports investigating the interviewing techniques of real-life interviews with children showed that many inappropriate verbal behaviours were being employed by interviewers (Schreiber *et al.*, 2006). The verbal behaviours described above are among those methods. However, no study has yet looked at how these verbal behaviours would be perceived by children. Furthermore, no study has yet looked at the distinctive positive or negative effects of these verbal behaviours specifically rather than as a group of behaviours.

The aim of the present experiment was to examine children's perceptions of different verbal behaviours which have previously been defined in the literature as either 'supportive' or 'non-supportive'. Children viewed video clips showing an interviewer adopting different combinations of the three verbal behaviours. After each clip, they answered six questions on their perceptions of the interviewer (e.g., whether they found him friendly or not). These ratings were then analysed to determine the impact of 'supportive' and 'non-supportive' behaviours on children's perceptions of the interviewer. It was predicted that 'supportive' verbal behaviours would be rated more positively by children than 'non-supportive' ones.

Participants

Forty-four children participated in this study. There were 26 girls (8-yrs-old: 4, 9-yrs-old: 13, 10-yrs-old: 9) and 18 boys (8-yrs-old: 2, 9-yrs-old: 10, 10-yrs-old: 6). They were aged between eight- and ten-years-old ($M = 9.3$ years, $SD = .68$ years). Children from two different classrooms participated in the experiment. They mainly came from middle-class families.

Materials

Clips. The three following verbal behaviours were chosen for the clips: (i) neutral/positive statements or negative coercion (e.g., I don't know what happened; your friend already told me everything); (ii) positive or negative reinforcement (e.g., you're doing great; you can do better); and (iii) positive or negative filler (e.g., uh-huh; um). These behaviours were mixed so as to give eight different possible combinations (See Table 9 for the eight combinations).

Table 9. *The eight combinations of verbal behaviours used in the video clips.*

	Verbal coercion	Verbal reinforcement	Verbal filler
1	Neutral/positive statement	Positive	Positive
2	Neutral/positive statement	Positive	Negative
3	Neutral/positive statement	Negative	Positive
4	Neutral/positive statement	Negative	Negative
5	Negative	Positive	Positive
6	Negative	Positive	Negative
7	Negative	Negative	Positive
8	Negative	Negative	Negative

Eight clips were filmed for the purpose of this experiment; one clip for each combination of verbal behaviours. Each clip lasted about one minute. In order to control for possible order effects, the eight clips were randomly grouped in four

series of eight, with one clip for each behaviour combination in each series. The clips showed a male actor sitting and talking to an unseen young person near the camera. The actor followed a script in which he asks the child a few questions about a previous museum visit (see Appendix C for the interviewer's text). The different verbal behaviours were incorporated at specific points throughout the script. The same actor appeared in all videos. The topic of the script was a visit to a museum. It was ensured that the tone of voice and the nonverbal behaviours of the actor remained as neutral as possible and as similar as possible throughout all the clips. The interviewer's clothes and the room environment were also similar in all clips. The actor was blind to the aims of the study.

Questionnaire booklet. The questionnaire booklet used for this study was the same as used for our previous study on children's perceptions of nonverbal behaviours (see Appendix B). It asked children for their age and gender, followed by eight sheets, each with six questions to be answered for each of the eight clips they saw. The six questions measured six different traits of the interviewer (i.e., friendliness, strictness, helpfulness, sincerity, boredom, and stress). The questionnaire was based on similar ones used in previous studies of perception and impression formation (e.g., Brooks, Church, & Fraser, 1986; Thomas, Skitka, Christen, & Jurgena, 2002). Children responded to each perception question by circling a response between one and five - where a score of one meant 'not at all' (e.g., I found the interviewer not at all friendly) and a score of five meant 'very' (e.g., I found the interviewer very friendly).

Procedure

The children viewed the video clips in groups of between eight and thirteen. Each child received a questionnaire booklet and was asked to write down their age

and gender. The group was then told that they would be watching clips of an interviewer and that they would have to answer questions about him afterwards. The first clip was then shown after which participants were asked to read the questions for the first clip and rate the interviewer on the six dimensions (i.e., friendliness, strictness, sincerity, helpfulness, boredom and stress). When all were finished, the second clip was shown and so on for all eight clips. The whole task took between 15 and 20 minutes for each group to complete. The entire sample was tested over the course of a single day. The testing took place in an unused classroom within the school.

Results

Relationships between the six different perception attributes

As shown in Table 10, children’s ratings of the positive attributes (i.e., friendliness, helpfulness and sincerity) were positively correlated with each other, as were the negative attributes (i.e., strictness, boredom and stress). Importantly, none of the positive and negative traits were positively associated with each other.

Table 10. *Mean correlations between children’s ratings for the six perceptions measures².*

	Friendliness	Helpfulness	Sincerity	Strictness	Boredom	Stress
Friendliness	~	0.60	0.42	-0.20	-0.23	-0.23
Helpfulness		~	0.51	-0.21	-0.33	-0.33
Sincerity			~	-0.09	-0.31	-0.24
Strictness				~	0.18	0.16
Boredom					~	0.17
Stress						~

² Due to problems with independence, it was not appropriate to calculate statistical significance for these correlations. The mean correlations are presented here as purely descriptive data to demonstrate that traits which should be related conceptually (e.g., positive and negative traits) were indeed rated in the same direction. The correlation matrices for each clip can be found in Appendix G.

Descriptive statistics for each interviewer behaviour were generated by averaging participants' perception scores across the four different clips in which that behaviour was displayed (e.g., participants saw four clips in which the interviewer was using positive verbal reinforcements, and four clips in which he was using negative verbal reinforcements). Table 11 shows the means for the children's ratings of the six perception attributes for the verbal behaviours. These means show that children generally rated the interviewer highly on the positive attributes (i.e., friendliness, helpfulness, and sincerity) when he was using neutral/positive statements and highly on the negative attributes (i.e., strictness, boredom, and stress) when using verbally coercive statements. These data also illustrate that children may have found it difficult to evaluate the interviewer based on his verbal reinforcement behaviour as the ratings for this behaviour were quite similar for both its positive and negative forms.

Table 11. *Means of children's perception ratings for the verbal behaviours (standard deviations in parentheses).*

	Positive behaviours			Negative behaviours		
	Neutral statements	Reinforce	Filler	Coercion	Reinforce	Filler
Friendly	3.41 (1.18)	3.18 (1.19)	3.31 (1.09)	2.97 (1.26)	3.2 (1.29)	3.07 (1.37)
Helpful	3.3 (1.73)	3.03 (1.3)	3.07 (1.18)	2.61 (1.31)	2.88 (1.28)	2.84 (1.38)
Sincere	3.64 (1.14)	3.38 (1.26)	3.63 (1.1)	2.95 (1.29)	3.21 (1.26)	2.96 (1.33)
Strict	3 (1.34)	3.1 (1.33)	3.03 (1.34)	3.36 (1.23)	3.26 (1.27)	3.33 (1.24)
Bored	2.83 (1.33)	2.97 (1.4)	2.84 (1.27)	3.26 (1.34)	3.12 (1.29)	3.26 (1.4)
Stressed	2.66 (1.12)	2.87 (1.16)	2.78 (1.18)	2.84 (1.27)	2.63 (1.23)	2.72 (1.22)

Preliminary analyses were carried out to observe the possible effects of age and gender on children's perceptions ratings. T-tests for gender revealed a significant difference for the stress ratings. Girls rated the interviewer as significantly more stressed (girls $\underline{M} = 2.88$, $\underline{SD} = 1.05$; boys $\underline{M} = 2.56$, $\underline{SD} = 1.37$; $t_{42} = 2.46$, $p = .01$) and bored (girls $\underline{M} = 3.17$, $\underline{SD} = 1.25$; boys $\underline{M} = 2.87$, $\underline{SD} = 1.46$; $t_{42} = 2.06$, $p < .05$) than boys. A one-way ANOVA for the age variable showed significant differences for friendliness ($F_{2, 41} = 5.62$, $p < .01$), helpfulness ($F_{2, 41} = 7.28$, $p = .001$), sincerity ($F_{2, 41} = 8.84$, $p < .001$), and stress ($F_{2, 41} = 4.38$, $p < .05$). The means and mean differences for these significant effects are shown in Table 12.

Table 12. Means and mean differences for 8-, 9-, and 10-years-old on the significant perception ratings (standard deviations and significance values in parentheses).

	8-years-old	9-years-old	10-years-old	8-9	8-10	9-10
Friendly	3.56 (1.11)	3.27 (1.16)	2.92 (1.36)	n.s.	-.65 (<.01)	-.36 (<.05)
Helpful	3.42 (1.11)	3.04 (1.22)	2.64 (1.38)	n.s.	-.78 (<.001)	-.40 (<.05)
Sincere	3.54 (.97)	3.48 (1.21)	2.91 (1.37)	n.s.	-.63 (<.01)	-.57 (<.001)
Stress	2.56 (1.15)	2.63 (1.12)	3.01 (1.30)	n.s.	n.s.	.38 (<.05)

In the following analysis the clips have been treated as independent, which accounts for the high degrees of freedom. This issue has been rectified by running the study reported on pages 104-108. The MANOVA is retained here for the sake of completeness. A 2 (neutral/positive statement vs. negative verbal coercion) x 2 (positive vs. negative verbal reinforcement) x 2 (positive vs. negative verbal filler) MANOVA was carried out to test the effects of verbal behaviours on the perceptions scores. The dependent variables were children's ratings of the six perception questions.

The analysis revealed that there were multivariate effects for all three verbal behaviours: (i) verbal coercion (Wilks' λ = .90, $F_{6, 299} = 5.60$, $p < .001$); (ii) verbal filler (Wilks' λ = .91, $F_{6, 299} = 5.14$, $p < .001$); and (iii) verbal reinforcement (Wilks' λ = .95, $F_{6, 299} = 2.54$, $p = .02$). All the interactions including only the verbal behaviours were significant: (i) verbal coercion, verbal reinforcement, and verbal filler (Wilks' λ = .90, $F_{6, 299} = 5.74$, $p < .001$); (ii) verbal reinforcement and verbal filler (Wilks' λ = .91, $F_{6, 299} = 5.20$, $p < .001$); (iii) verbal coercion and verbal reinforcement (Wilks' λ = .93, $F_{6, 299} = 4.04$, $p = .001$); and (iv) verbal coercion and verbal filler (Wilks' λ = .96, $F_{6, 299} = 2.10$, $p = .05$).

Univariate analyses were carried out for the significant interactions. These showed that the interviewer was rated as more sincere (M = 4.07, SD = .76) and as less bored (M = 2.07, SD = 1.02) when adopting all verbal behaviours in their positive forms than when in their negative forms (sincerity: M = 2.07, SD = .97; boredom: M = 3.61, SD = 1.24). When using all the negative verbal behaviours, he was also perceived as less friendly (M = 1.98, SD = 1) and less helpful (M = 1.98, SD = 1.17) than when using neutral/positive statements, negative reinforcements, and negative fillers (friendliness: M = 4.14, SD = .93; helpfulness: M = 3.75, SD = 1.12). The interviewer was also rated as less strict (M = 2.27, SD = 1.26) when using all the verbal behaviours positively than when using neutral/positive statements, positive reinforcements, and negative fillers (M = 3.57, SD = 1.21).

The interviewer was perceived as less stressed (M = 2.31, SD = 1.13) when adopting negative verbal reinforcements and fillers than when using positive reinforcements and negative fillers (M = 3.14, SD = 1.17), at which time he was also rated as more strict (M = 3.47, SD = 1.21) and more bored (M = 3.35, SD = 1.44) than when using positive verbal reinforcements and fillers (strictness: M = 2.73, SD

= 1.35; boredom: \underline{M} = 2.59, \underline{SD} = 1.27). When the interviewer was using negative coercion and reinforcements, he was rated as less friendly (\underline{M} = 2.65, \underline{SD} = 1.26) and less helpful (\underline{M} = 2.34, \underline{SD} = 1.24) than when using neutral/positive statements and negative reinforcements (friendliness: \underline{M} = 3.76, \underline{SD} = 1.06; helpfulness: \underline{M} = 3.41, \underline{SD} = 1.08). The interviewer was also rated as less friendly (\underline{M} = 2.61, \underline{SD} = 1.31) when using negative coercion and fillers than when using neutral/positive statements and negative fillers (\underline{M} = 3.52, \underline{SD} = 1.28).

Discussion

The aim of this first study was to examine children's perceptions of different interviewer verbal behaviours. The results showed that the interviewer was perceived by the children as having the most positive attributes when using the 'supportive' behaviour of neutral/positive verbal statements whereas he was seen as most negative when using a 'non-supportive' behaviour (i.e., negative verbal coercions). Verbal fillers had smaller negative and positive effects and verbal reinforcements seemed to influence children's perceptions very little. However, interactions between the verbal behaviours showed a much more complex picture, suggesting that perhaps there were too many variables present to appropriately examine their individual effects on children's perceptions. Furthermore, and similarly to the first study on nonverbal behaviours, as there was an issue with the independence of the variables in the analysis, it was thought preferable to consider fewer behaviours. Therefore, a subsequent experiment was carried out, this time, focusing on a single verbal behaviour instead of three with each participant being shown only one clip. Although verbal coercion was the most influential variable in the present study, it was felt to be too strong a manipulation, from an ethical point of view, to use in interviews with children. Verbal reinforcement was believed to be

more straightforward to operationalise. Furthermore, as verbal reinforcement seemed to be the most often used verbal behaviour in actual forensic interviews (Schreiber *et al.*, 2006) and because it is viewed with criticism in both its positive and negative forms (Garven, Wood, & Malpass, 2000), the present study was replicated with only this verbal behaviour.

Children's Perceptions of Verbal Reinforcements

Method

Participants

Forty-five children aged between eight- and ten-years-old ($M = 8.78$, $SD = .71$) participated in this study. There were 26 girls (8-yrs-old: 11, 9-yrs-old: 10, 10-yrs-old: 5) and 19 boys (8-yrs-old: 11, 9-yrs-old: 6, 10-yrs-old: 2). None of the children who took part in this experiment had been participants in the previous study on verbal behaviours. The children came from two different classrooms from a school in a largely middle-class area.

Materials

Clips. On the basis of the findings of the study reported in the previous chapter, it was decided to verify children's perceptions of interviewer verbal reinforcement behaviour. Two clips were filmed for the purpose of this experiment. In one clip, the interviewer used positive verbal reinforcements (e.g., you're doing great; well done) whereas in the other clip, negative verbal reinforcements were used (e.g., you can do better; hurry up). The clips were about one minute in length. The subject of the clip was the same as for the previous study, namely, the interviewer was seen sitting and talking to an unseen young person about a previous visit to a museum. Once more, it was ensured that the room environment, the tone of voice,

clothes and nonverbal behaviours of the actor remained as neutral as possible and as similar as possible throughout both clips. The person acting as the interviewer was blind to the aims of the study.

Questionnaire booklet. The same type of questionnaire was used for this study, asking children for their age and gender, followed by one sheet with six questions to be answered for the clip they saw. The six questions measured the same six traits of the interviewer (i.e., friendliness, strictness, sincerity, helpfulness, boredom and stress). Responses to each of the six questions were given on five-point Likert scales with 1 meaning 'not at all' and 5 meaning 'very' (see Appendix B for a copy of the questionnaire).

Procedure

Four groups of between ten to fifteen children participated. Each child received a questionnaire booklet and was asked to write down their age and gender. They were then told that they would be watching a video clip and would be asked to answer six questions about the interviewer afterwards. Two groups ($N = 22$) saw the clip with the interviewer using positive verbal reinforcements while the other two groups ($N = 23$) viewed the video with the interviewer using negative verbal reinforcements. The children watched the clip and then completed the questionnaire. The experiment for each group lasted no more than seven minutes.

Results

Relationships between the six perception attributes

The correlation matrix generated for the six perceptions measures (see Table 13) showed that all the negative attributes (i.e., strictness, boredom, and stress) correlated with each other. Friendliness and helpfulness were also related. Sincerity, however, did not correlate with any other interviewer traits, again implying that

perhaps children found it hard to rate the interviewer’s sincerity based on whether he was using positive or negative verbal reinforcements.

Table 13. *Correlation matrix for the six perceptions measures.*

	Friendliness	Helpfulness	Sincerity	Strictness	Boredom	Stress
Friendliness	~	0.33 *	0.26 n.s.	-0.36 *	-0.32 *	-0.43 ***
Helpfulness		~	0.18 n.s.	-0.39 *	-0.36 *	-0.44 ***
Sincerity			~	-0.1 n.s.	-0.28 n.s.	-0.25 n.s.
Strictness				~	0.34 *	0.42 ***
Boredom					~	0.54 ***
Stress						~

Key: * denotes $p < .05$; *** denotes $p < .005$; n.s. denotes ‘not significant’.

The effects of interviewer verbal reinforcement behaviour on children’s perceptions

A preliminary 2 (positive reinforcements vs. negative reinforcements) x 2 (girl vs. boy) x 3 (eight- vs. nine- vs. ten-years-old) multivariate analysis of variance was performed. As it did not show any significant effects of either age or gender, these were excluded from the subsequent analysis. The MANOVA performed demonstrated a significant effect of verbal reinforcements on the six perceptions measures (Wilks’ λ = .37, $F_{6,38}$ = 10.64, $p < .001$).

Univariate analyses showed a significant effect of verbal reinforcement on all six perception measures. The test’s statistics are reported in Table 14 and the means are illustrated in Figure 4.

Table 14. *Univariate statistics of the effect of verbal reinforcement on the six perception measures.*

	F	p	η^2
Friendly	26.10	< .001	.38
Helpful	20.11	< .001	.32
Sincere	4.31	< .05	.09
Strict	14.99	< .001	.26
Bored	13.94	< .001	.25
Stressed	19.20	< .001	.31

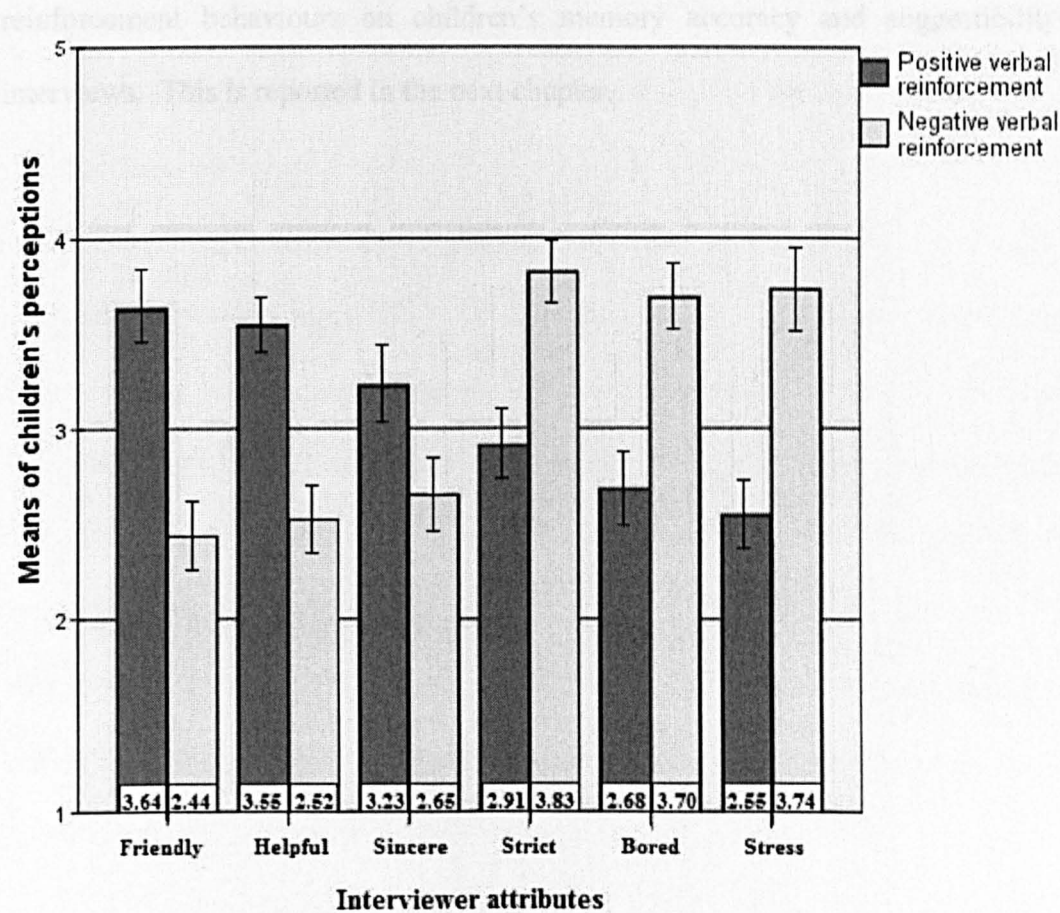


Figure 4. *The effects of interviewer's verbal reinforcement behaviours on children's perceptions (with standard error bars).*

Discussion

The results of this study showed that an interviewer using positive verbal reinforcements was perceived as friendly, helpful and sincere to children whereas one using negative verbal reinforcements was rated as strict, bored and stressed.

This is in accordance with previous communication studies which have found a positive effect of adults' supportive verbal behaviours on children's perceptions (Woolfolk & Woolfolk, 1974). Furthermore, in line with previous findings reported in this thesis and previous research (e.g., Kohn, 1993), it also appeared that participants found it difficult to judge the interviewer's sincerity based on the different verbal reinforcement behaviours he was displaying. Following these results, a further study was designed in order to test the effects of interviewer verbal reinforcement behaviours on children's memory accuracy and suggestibility in interviews. This is reported in the next chapter.

CHAPTER 6: THE EFFECTS OF INTERVIEWERS' VERBAL REINFORCEMENT BEHAVIOURS ON CHILDREN'S TESTIMONY

Abstract

The verbal reinforcement behaviours identified in the previous chapter was tested in interviews with children. Eighty-seven eight- to ten-year-old children participated in a learning activity about the vocal chords. Following a week delay, they were individually interviewed about the activity by an interviewer adopting either positive or negative verbal reinforcements. The results demonstrated that children interviewed by the interviewer saying positive verbal reinforcements were significantly more accurate on neutral questions, more resistant on suggestive questions and were more likely to answer with "I don't know" than children interviewed by the interviewer using negative reinforcements. Children were more accurate on questions concerning central details of the event than on those referring to peripheral details. Children in the non-supportive condition were more likely to incorrectly report having been touched during the activity than children interviewed with positive verbal reinforcements. These children also reported feeling less anxious after the interview than children in the non-supportive group (i.e., interviewed with negative reinforcements).

This study was designed to extend the findings of the second experiment reported in Chapter 5 by investigating the effects of an interviewer's verbal reinforcement behaviours on children's memory accuracy and suggestibility. In small groups, children took part in a learning activity about the vocal chords. One week later, they were individually interviewed about the activity by an interviewer adopting either the 'supportive' verbal behaviour (i.e., positive verbal reinforcement) or the 'non-supportive' behaviour (i.e., negative verbal reinforcement). Children's trait and state anxiety were also measured. In line with previous research (e.g., Almerigogna *et al.*, 2007; Carter *et al.*, 1996; Davis & Bottoms, 2002), it was predicted that children in the non-supportive condition would be less resistant on the suggestive questions than those in the supportive condition. Children's tendency to answer with "I don't know" was also explored and we predicted that children interviewed by the supportive interviewer would be more likely to give such answers than children in the non-supportive condition. It was also predicted that similarly to previous studies (e.g., Wright & Stroud, 1998; Yuille & Daylen, 1998) children would remember central details better than peripheral details. A difference in state anxiety was expected between the two conditions, with children interviewed by the non-supportive interviewer feeling more anxious post- than pre-interview whereas children interviewed by the supportive interviewer would feel less anxious after the interview. Lastly, we predicted that children interviewed by the non-supportive interviewer would be more likely to erroneously report having been touched during the activity than children in the supportive condition.

Method

Participants

Eighty-seven children (40 girls -eight-years-old: 8, nine-years-old: 23, ten-years-old: 9- and 47 boys -eight-years-old: 10, nine-years-old: 23, ten-years-old 14-) aged between eight- and ten-years-old ($M = 9.10$ years, $SD = .68$ years) participated in this study. The participants were all pupils from the same primary school in Belgium and all spoke French as their first language. Four classrooms participated; the school was located in a largely middle-class area. None of the children who participated in the previous studies took part in the present one. Girls and boys were equally distributed across the conditions.

Materials

Event. The learning activity was the same as that used in the study reported in Chapter 4. A speech therapist, who was blind to the aims of the experiment, taught the children about the vocal chords. She explained what vocal chords were, where they could be found and showed the children what they looked like by drawing three sketches on a board representing the vocal chords at rest, while inhaling deeply and when sick. She then explained how the vocal chords worked, making sounds as examples. She asked the children to make the sounds 'aaaah', 'eeeeee' and 'rrrr' with her and to feel on their own chest and throat the vibrations of the sounds they were making. She then thanked the children for their time and reminded them to take good care of their voice. The event lasted about 10 minutes.

Anxiety questionnaire. The questionnaire used to measure trait and state anxiety was the French translation of Spielberger, Edwards, Lushene, Montuori, and Platzek's (1973) State-Trait Anxiety Inventory for Children (STAI-C) (see Chapter 2 and Appendix A). It comprised 40 items printed on two sheets. The first part of the

questionnaire consisted of 20 items designed to measure children's trait anxiety and so were designed to measure how the children generally feel. It included statements such as "I am shy", "I notice my heart beats fast" and "I worry about what others think of me". These questions were answered by indicating 'hardly-ever', 'sometimes' or 'often'. The other 20 items measured their state anxiety with statements like "I feel very calm, calm or not calm", "I feel very nervous, nervous or not nervous" and "I feel very terrified, terrified or not terrified". Whilst answering the latter 20 items, the children were required to think about how they felt at that exact time. The instructions were written on top of the questionnaires.

Interviewer manner manipulation. Supportive and non-supportive interviewer behaviours were operationalised in line with the results of the previous study. Thus, in the supportive interviews, the interviewer was using positive verbal reinforcements (e.g., you're doing great; well done) whereas in the non-supportive interviews, the interviewer was using negative verbal reinforcements (e.g., you can do better; hurry up). The same number of positive or negative verbal reinforcements was conveyed in both conditions. The interviewer followed a script in which either positive or negative verbal reinforcements were spoken at seven pre-specified points throughout the interviews (see Appendix D for the interview questions and script). It was ensured that the tone of voice, the nonverbal behaviours and the clothes of the interviewer as well as the room remained constant throughout all interviews and across conditions. The same female interviewer (blind to the aim of the study) conducted all the interviews which all took place in the same room at the School. It was not the same interviewer who appeared in the studies reported in Chapter 5.

Structure of the interview and interview questions. At the beginning of the interview, the interviewer explained what the interview would be about.

“Let me tell you why we’re both here today. We’re here because I would like to know what happened last week when you participated in that learning activity. Do you remember? Well, I’m just going to ask you a few questions, is that ok? If I ask you a question and you don’t know the answer that’s fine, just tell me that you don’t know. Remember that I wasn’t there, I don’t know what happened so don’t be afraid to say everything you can remember even if you think it’s silly or not important ok? ”

During the interview, children were asked 18 questions about the learning activity in which they participated. The questions were the same as those used in the previous study on interviewer nonverbal behaviours (see Table 2 in Chapter 2 of this thesis for the interview questions). Five of the questions were neutral and measured memory accuracy and 13 contained some form of misinformation and measured suggestibility. Furthermore, three of the neutral questions and seven of the suggestive questions referred to central details of the learning activity; and two neutral questions and six suggestive questions concerned peripheral details of the activity.

Procedure

In groups of four, children participated in a learning activity about the vocal chords. The event lasted about ten minutes for each group. One week later, children were individually interviewed following the structure detailed above. Interviews lasted between 10 and 15 minutes and took place at the children’s school, in a room adjacent to their classroom. Children’s answers to the interview questions were recorded by the interviewer. All answers were short in length, so the interviewer was easily able to accurately record them by hand during the interviews. Children were then thanked for their participation and returned to their normal class activities.

Coding and measures

An accuracy score was calculated by adding up the number of correct answers to the questions for each child. The answers were coded as either 'accurate' if the answer was judged as correct, 'inaccurate' if the answer was incorrect, or as "don't know" if the child stated that he or she did not know the answer. Children's answers on the interviewer's coding sheets were coded by the first author and by a second coder who was blind to the aim of the experimental conditions. Cohen's Kappa was .93 which, following Fleiss's (1981) recommendations is considered excellent agreement. Any disagreements were resolved by discussion between the two coders.

The number of accurate answers for each type of question (i.e., neutral central, neutral peripheral, suggestive central and suggestive peripheral) were then computed. As the number of questions was uneven for each type, responses were recoded into proportions ranging from 0 to 1. This was done by dividing the total number of accurate responses to each type of question (e.g., neutral central, suggestive central) by the number of questions in that category. For example, scores for the suggestive central questions were divided by seven as there were seven suggestive central questions. The "I don't know" answers were excluded from the accuracy scores and the overall proportion of times children answered with "I don't know" was recorded separately. The STAI-C measures were calculated following the instructions in the inventory's manual (Spielberger *et al.*, 1973).

Results

Interviewing style manipulation check

The effects of the two interviewing styles on children's trait and pre- and post-interview state anxiety measures were observed (see Table 15). The results demonstrated that children in the supportive condition were less state anxious after than before the interview ($t_{43} = 7.01, p < .001$), whereas in the non-supportive condition they became more anxious ($t_{42} = -9.46, p < .001$). Trait anxiety did not differ for the two interviewing styles ($t_{85} = -1, n.s$).

Table 15. Means for trait anxiety, pre- and post-interview state anxiety for the supportive and non-supportive interviewing style groups (standard deviations in parentheses).

	Trait anxiety	Pre-state anxiety	Post-state anxiety	State anxiety mean difference
Supportive	37.41 (6.22)	31.86 (6.62)	28.30 (5.05)	3.57 (3.38)
Non-supportive	38.79 (6.66)	31.79 (6.37)	37.65 (6.26)	-5.86 (4.06)

Effect of interviewing style, question type and question detail on children's accuracy

Initial analysis revealed that overall children were quite accurate. Across all conditions and questions the mean proportion accuracy score was .60 (SD = .33). Means and standard deviations for the proportions of accurate, inaccurate, and "don't know" answers are showed in Table 16 which shows that in general children gave more erroneous answers when interviewed by the non-supportive interviewer than when interviewed by the supportive one. Children in the supportive condition were more likely to say that they did not know an answer than those in the non-supportive group.

Table 16. Means of the Proportion of Accurate, Inaccurate and “Don’t Know” Answers (Standard Deviations in Parentheses).

	Supportive	Non-supportive
Proportion of accurate answers	0.68 (0.08)	0.56 (0.11)
Proportion of inaccurate answers	0.09 (0.06)	0.35 (0.11)
Proportion of “don’t know” answers	0.23 (0.07)	0.09 (0.06)

Preliminary analyses were carried out to observe the possible effects of children’s age and gender on their accuracy. The t-test for the age variable showed no significant effect ($t_{85} = -.13$, n.s.) as did the one-way ANOVA for the gender variable ($F_{2, 84} = .27$, n.s.). A 2 (supportive vs. non-supportive) x 2 (suggestive vs. neutral question) x 2 (central vs. peripheral detail) mixed model ANOVA analysis was conducted on the proportions scores of accurate answers. Interviewing style was a between-subjects variable and question type and question detail were both within-subjects variables.

The results demonstrated that children were more accurate when questioned by the supportive interviewer ($M = .68$, $SD = .08$) than when interviewed by the non-supportive interviewer ($M = .56$, $SD = .11$) ($F_{1, 85} = 21.97$, $p < .001$, partial $\eta^2 = .06$). They also gave more correct answers to neutral questions ($M = .64$, $SD = .35$) than to suggestive questions ($M = .56$, $SD = .30$) ($F_{1, 85} = 14.68$, $p < .001$, partial $\eta^2 = .04$). These main effects were qualified by a significant interaction between interviewer style and question type ($F_{1, 85} = 10.86$, $p = .001$, partial $\eta^2 = .03$). As shown in Figure 5, children gave more accurate answers to the suggestive questions when interviewed by the supportive interviewer compared to the non-supportive interviewer, but their answers to the neutral questions did not differ as a function of whether the interviewer behaved in a supportive or non-supportive manner.

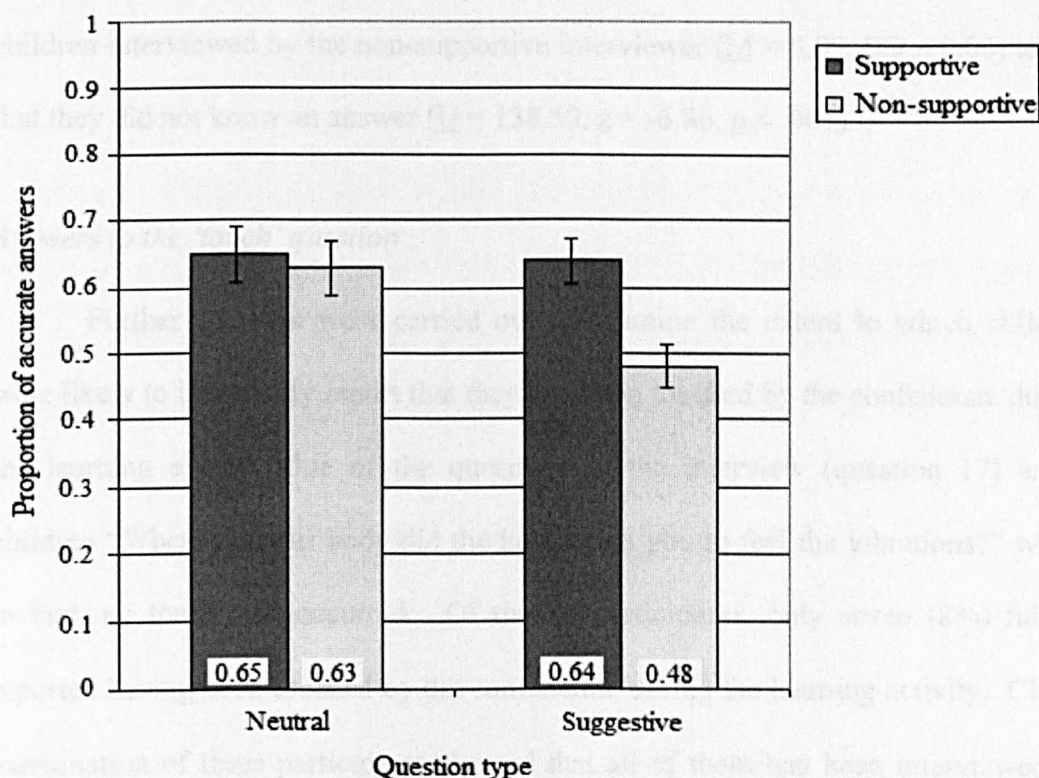


Figure 5. *Proportion of accurate answers as a function of interviewing style and question type (with standard error bars).*

There was also a main effect of question detail; children were more accurate on questions about central details ($M = .87$, $SD = .16$) than on questions about peripheral details ($M = .33$, $SD = .23$) ($F_{1, 85} = 140.15$, $p < .001$, $\text{partial } \eta^2 = .69$). All other interactions were not significant.

Children's "don't know" answers

Children's tendency to respond "I don't know" to the interviewer was analysed. As there were few answers of this type, parametric statistics were inappropriate. However, because we believed that interviewer manner may have influenced the extent to which children responded with "I don't know", these data were analysed using the appropriate non-parametric test (i.e., Mann-Whitney). Interviewing style was entered as the grouping variable. The results showed that

children in the supportive condition ($M = 0.23$, $SD = 0.07$) were more likely than children interviewed by the non-supportive interviewer ($M = 0.09$, $SD = 0.06$) to say that they did not know an answer ($U = 138.50$, $z = -6.86$, $p < .001$).

Answers to the 'touch' question

Further analyses were carried out to examine the extent to which children were likely to incorrectly report that they had been touched by the confederate during the learning event. One of the questions in the interview (question 17) asked children "Where on your body did the lady touch you to feel the vibrations?" when, in fact, no touch had occurred. Of the 87 participants, only seven (8%) falsely reported having been touched by the confederate during the learning activity. Closer examination of these participants showed that all of them had been interviewed by the non-supportive interviewer. That is, 16% of the children interviewed by a non-supportive interviewer reported an adult touch where there had been none.

Relationship between anxiety and accuracy

To further investigate the possible relationship between anxiety and accuracy, a new variable was calculated from participants' pre- and post-interview state anxiety measure. The post-interview anxiety scores were subtracted from the pre-interview anxiety scores so as to give a pre- to post-interview change in the state anxiety scores of each participant (state anxiety variation range of 38 between -19 and 19). A positive score on this variable therefore showed that the participant became less anxious during the interview (e.g., a pre-state anxiety score of 30 minus a post-state anxiety score of 25 equals a difference of +5) whereas a negative score indicated a rise in anxiety (e.g., a pre-state anxiety score of 30 minus a post-state anxiety score of 35 equals a difference of -5). Correlations between children's state anxiety

variation and accuracy proportions for both neutral and suggestive questions demonstrated that there was no relationship between state anxiety variations and the number of accurate answers on neutral questions ($r = .12, p = .26$) but there was a significant relationship between state anxiety and children’s resistance to the suggestive questions ($r = .61, p < .001$) (see Figure 6 for the scatterplot). Children who reported feeling less anxious after the interview than before were more resistant to misleading questions than children feeling more anxious post- than pre-interview.

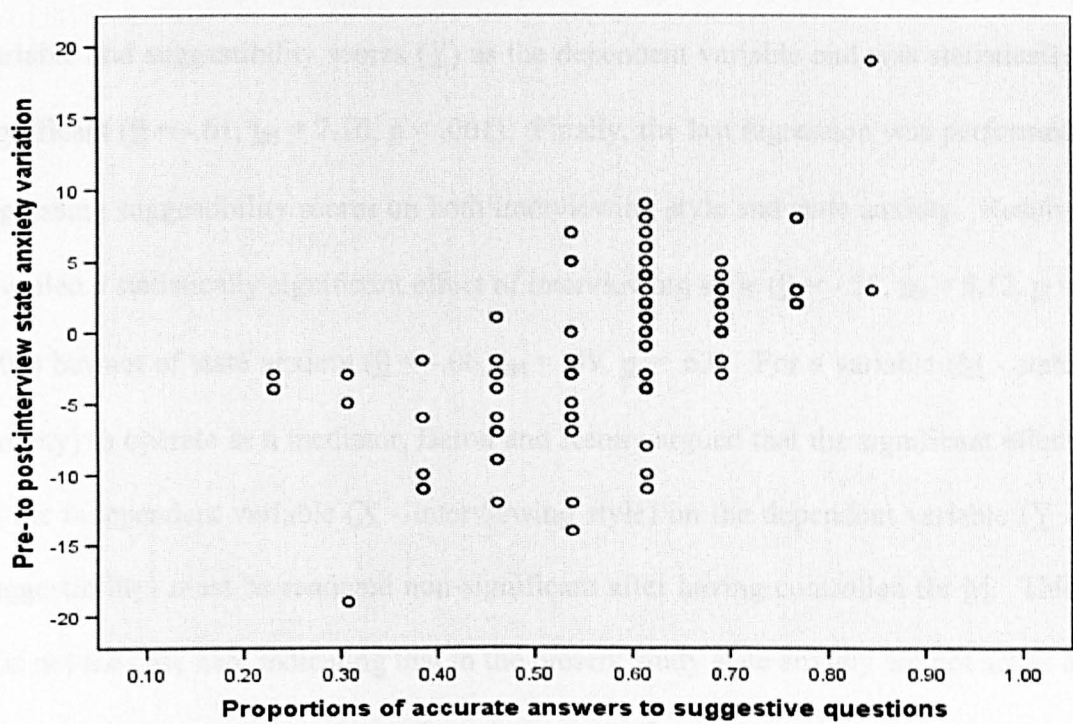


Figure 6. Scatterplot of the correlation between state anxiety variation and proportion of accurate answers to suggestive questions.

Anxiety as mediator between interviewer behaviours and resistance to suggestive questions

A mediational analysis was carried out to verify if, in the present study, state anxiety could be acting as a mediator between interviewing style and suggestibility.

A mediational model states that a variable X (the independent variable, i.e., interviewing style) influences a variable Y (the dependent variable, i.e., suggestibility scores) through a variable M (the mediating variable, i.e., state anxiety). Following Baron and Kenny's (1986) guidelines for determining mediation, three regression equations were carried out. The first regression was performed to check the effect of interviewing style on state anxiety (the influence of X on M). The results were statistically significant ($\beta = .64$, $t_{85} = 7.68$, $p < .001$). A second regression was conducted with interviewing style (X) as the independent variable and suggestibility scores (Y) as the dependent variable and was statistically significant ($\beta = -.61$, $t_{85} = 7.10$, $p < .001$). Finally, the last regression was performed regressing suggestibility scores on both interviewing style and state anxiety. Results revealed a statistically significant effect of interviewing style ($\beta = -.58$, $t_{84} = 5.12$, $p < .001$) but not of state anxiety ($\beta = -.06$, $t_{84} = .49$, $p = .63$). For a variable (M - state anxiety) to operate as a mediator, Baron and Kenny argued that the significant effect of the independent variable (X - interviewing style) on the dependent variable (Y - suggestibility) must be rendered non-significant after having controlled for M. This was not the case here indicating that in the present study state anxiety did not act as a mediator between interviewing style and suggestibility scores.

Discussion

This study was carried out in order to examine the effects of interviewer verbal reinforcement behaviours on children's eyewitness testimony. Overall, children were quite resistant to suggestions. However, the results showed that the two different interviewing styles significantly affected children's accuracy. As predicted, children interviewed by the interviewer using negative verbal reinforcements (e.g., you can do better) were significantly less resistant on the

misleading questions than children interviewed by the interviewer using positive verbal reinforcements (e.g., you're doing great). Children's numbers of correct answers to neutral questions were not influenced by the experimental manipulation. Supporting the hypothesis, an effect of question detail was noted, with children giving more correct answers to questions about central details than to questions referring to peripheral details of the event. There also was an effect of interviewer manner on children's tendency to answer "I don't know". Children interviewed by the supportive interviewer said that they did not know an answer more often than children questioned by the non-supportive interviewer. Furthermore, in line with the prediction, there was a clear effect of interviewing style on children's tendency to incorrectly report that they had been touched during the learning activity with all seven children who falsely reported such touch interviewed by the non-supportive interviewer. Finally, although as expected an effect of interviewing style on children's state anxiety levels was observed, with children interviewed by the non-supportive interviewer reporting feeling more anxious than those interviewed by the supportive interviewer, state anxiety did not act as a mediator between interviewing style and suggestibility in the present study.

CHAPTER 7: GENERAL DISCUSSION

Summary of Findings

The studies presented in this thesis looked at interviewer nonverbal and verbal behaviours and at their effects on children's perceptions and performances as eyewitnesses. The study reported in Chapter 3 showed that an adult's nonverbal behaviours were not all equally important to children's judgments. Whereas smiling and fidgeting behaviours positively or negatively influenced children's ratings of an interviewer, body posture had little effect. The subsequent study reported in Chapter 4 demonstrated that children-perceived supportive (i.e., smiling) and non-supportive (i.e., fidgeting) nonverbal behaviours influenced children's eyewitness reports in interviews. The smiling behaviour increased children's resistance to suggestive questions while fidgeting decreased it. The environments created by the two different interviewing manners were so dissimilar as to significantly affect children's answers to an abuse-related question with some of the children interviewed by the non-supportive interviewer incorrectly reporting that they had been touched by the adult during the learning activity. State anxiety, however, was not revealed as a mediator between interviewing style and children's suggestibility.

The studies reported in Chapter 5 showed that children experienced difficulty rating an interviewer when many different verbal behaviours were presented. We therefore conducted a further study solely investigating children's perceptions of positive and negative verbal reinforcement behaviours and found that sentences labelled as positive reinforcement (e.g., you're doing great) were rated positively whereas an interviewer using statements such as 'you can do better' was judged negatively. The next study reported in Chapter 6 showed that, in interviews, children

reacted differently to these two types of behaviours. Children interviewed by the interviewer using positive verbal reinforcements were more resistant to suggestive questions than children who received negative reinforcements. Furthermore, children in the non-supportive group were more likely to incorrectly assent to having been touched during the activity. Similarly to the second study, children's state anxiety levels were affected by the interviewer's verbal behaviours but did not reveal a role of mediator between interviewing style and children's suggestibility. The implications of these findings for interviews with child witnesses will now be discussed.

Children's Perceptions of Interviewer Behaviours

Two studies were conducted in order to examine whether nonverbal and verbal behaviours viewed as supportive or non-supportive in the child witness literature were perceived as such by children. The results of the first study reported in Chapter 3 showed that children gave high ratings of friendliness and helpfulness to the interviewer when he was smiling and high ratings of strictness, boredom and stress when he was fidgeting. Otta, Abrosio, and Hoshino (1996) showed that smiling individuals were perceived as more kind, attractive and happy, and Rockwell and Hubbard (1999) demonstrated that lawyers displaying nervous gestures such as fidgeting were seen as less credible and less interested in the interaction. The present results also demonstrated that children's perceptions of the interviewer were not significantly affected by body posture. Forensically speaking, this is quite surprising as many previous studies on interviewer-provided social support have included this behaviour in their manipulation (e.g., Carter *et al.*, 1996; Davis & Bottoms, 2002; Quas & Lench, 2007). In a study with adults, Machotka (1965) showed that people

sitting with a closed body posture were perceived by observers as cold, rejecting and passive. However, a study with children by Neil (1989) showed a very weak effect of teacher's body posture on children's perceptions. The present results suggest that a closed body posture may only have an effect in combination with other negative nonverbal behaviours (e.g., non-smiling or fidgeting) but that its effects might be diminished with more salient positive nonverbal behaviours (i.e., smiling and no fidgeting) (Burgoon, Buller, Hale, & deTurck, 1984). This does not mean that an interviewer's body posture is not important when trying to create a comfortable environment for interviewees but rather that the difference between open and closed body postures might be less salient for children's impression formation than the difference between a smiling and a non-smiling person (Grahe & Bernieri, 1999). DePaulo and Coleman (1987) stated that children are receptive to messages conveyed by others' nonverbal behaviours. This argument was supported by the present study as nonverbal cues played an important role in forming children's impressions of an adult interviewer.

The first study reported in Chapter 5 demonstrated that using combinations of positive and negative verbal behaviours may confuse children and their ratings of perceptions of an adult. The next study, however, showed that children perceived an interviewer saying positive verbal reinforcements as friendly and helpful and one using negative reinforcements as strict, bored and stressed. Woolfolk and Woolfolk (1974) illustrated that a teacher using positive verbal behaviours was perceived by children as supportive and interested in the children's understanding of the lesson. Our study also showed that children's judgment of the adult's sincerity was quite similar for the two verbal reinforcement conditions. This is in accordance with other research which found that both positive and negative verbal reinforcements may be

perceived by children as displaying equal levels of sincerity or insincerity (e.g., Kohn, 1993; Lepper, Woolverton, Mumme, & Gurtner, 1993). Furthermore, 'sincerity' may be a difficult concept to rate.

Communication researchers have shown that negative behaviours such as those studied in the present experiments (e.g., non-smiling, negative verbal reinforcements) usually communicate low interaction involvement and poor levels of intimacy (Mehrabian, 1972). That is, people exhibiting negative behaviours tend to be perceived as indifferent to the interaction and are usually evaluated less positively than people showing higher levels of interaction involvement (McMahan, 1976). Burgoon and Walther (1990) argued that this negative evaluation is due to the fact that by behaving in such a manner they violate people's expectations of what behaviours are appropriate in interactions. However, more research is definitely needed before we can say precisely which behaviours are important and which should be controlled for in interviews with children. The present studies also backed the notion that asking for children's perceptions is essential to the good functioning of an experiment as it adds support to its methodology. Researchers may thus be sure that what they refer to as 'supportive' or 'non-supportive' behaviours are actually being perceived as such by children.

Interviewing Styles, Memory and Suggestibility

Consistent with previous studies (e.g., Almerigogna *et al.*, 2007; Carter *et al.*, 1996; Davis & Bottoms, 2002), we found no effect of interviewing styles on children's memory accuracy when they were questioned using neutral, non-misleading questions. The results from Chapter 4 showed that overall the accuracy scores were lower for neutral questions than for the suggestive questions; this might

be due to the small number of questions in the two neutral categories. That is, three neutral central and two neutral peripheral questions may not have been enough to correctly measure children's memory accuracy. Future studies may therefore want to include a larger range of questions. Another explanation for these findings might come from the interview questions. Some of the suggestive questions may have provided children with more memory cues than some of the neutral questions. For example, question 11, a suggestive question, asked children: "She showed you some vocal chords. How? Did she show you photographs?" Asking children whether they were shown photographs may have reminded them of the drawings they actually saw thus increasing their resistance to that particular suggestion. On the other hand, question 15, a neutral question, asked: "Where on your body did you have to feel the vibrations?" This open-ended question may have been more difficult for children to answer (Poole & Lamb, 1998) as it provides no cues to the possible answer. Nonetheless, accuracy scores from Chapter 6 showed a high overall level of accuracy on neutral questions. This may be accounted for by children remembering many of the details of the learning activity, or, similarly, the low number of questions in this category (i.e., five) may have been too small to precisely measure children's accuracy.

The high overall level of accurate answers to suggestive questions implied that children were quite able to reject misleading information and report correct information instead. The results also showed that children were better able to resist suggestions when they were questioned by a supportive interviewer compared to a non-supportive interviewer. This is in accordance with previous research which has shown a positive effect of interviewer-provided social support on children's suggestibility (e.g., Davis & Bottoms, 2002; Quas & Lench, 2007).

Likewise, and in agreement with Carter *et al.* (1996), the increased anxiety felt by children interviewed by the non-supportive interviewer may be partly responsible for their heightened suggestibility. Feeling more anxious, these children may have allocated some of their cognitive resources to deal with intrusive thoughts and worry about themselves and their performance (Clark & Wells, 1995), they therefore had less available resources to allocate to the more difficult aspects of the task at hand, that is, answering the suggestive questions. Retrieving answers to neutral questions is, cognitively speaking, a less demanding task than undertaking a memory search to compare misleading information provided by an interviewer with what was initially witnessed (Schooler & Loftus, 1986). This might explain why the effects of interviewer manner were only related to children's suggestibility and not to their memory accuracy.

Davis and Bottoms (2002) claimed that the benefits raised from social support on memory shown in forensic research are ultimately limited. In previous studies, such as the studies reported in this thesis, interviewer-provided social support is usually given to children once by one interviewer and after a short delay from encoding. These conditions are clearly different from those observed in real-life interviews (Steward & Steward, 1996). Davis and Bottoms (2002) also noted that whereas one supportive interview may decrease children's suggestibility, multiple supportive interviews may tend to increase their suggestibility. Moreover, the effect of supportive interviews taking place after a significant delay is not known and is an important avenue for future research.

Interviewer's nonverbal behaviours and accuracy

The study reported in Chapter 3 showed that children gave higher ratings on the negative attributes (i.e., strictness, boredom and stress) to a fidgeting

interviewer. As stated, Mehrabian (1972) argued that many negative nonverbal cues are interpreted by observers as reflecting a lack of immediacy and involvement. Imhoff and Baker-Ward (1999) argued that children may be less prone to oppose an adult whom they view as distant and strict. Children might have complied more with whatever the non-supportive interviewer was saying, which increased their suggestibility, whereas in the supportive condition, they felt more at ease and confident, enabling them to disagree more with the interviewer (Lyon, 1999).

Interviewer's verbal behaviours and accuracy

The study reported in Chapter 6 revealed that children being positively reinforced verbally by the interviewer were less suggestible than children receiving negative verbal reinforcements. This finding is interesting as it runs counter to other research which has shown a detrimental effect of verbal reinforcement in both its positive and negative forms (e.g., Schreiber *et al.*, 2006). There might be several explanations for these discrepancies. Firstly, in previous studies as in forensic interviews, the interviewer's verbal reinforcement behaviour is usually dependent on the child's answers. An expected answer would elicit a positive reinforcement (e.g., you're doing very well; you're very smart) whereas an answer which does not concord with the interviewer's expectations is likely to bring forth a negative reinforcement (e.g., you're not helping us here; you can do better than that). The reinforcing behaviour is used by the interviewer to convey to interviewees the message that their answers are either pleasing or not. If the answer is satisfying, interviewees are encouraged to continue in the same direction; if undesirable, the answer should be changed to be as required. For example, in a study by Billings, Taylor, Burns, Corey, Garven, and Wood (2007), half of their five- to nine-year-old child participants were reinforced after giving answers that incriminated themselves;

the other half was not. Their results showed that those children receiving positive verbal reinforcements from the interviewer after such answers were more likely to falsely admit knowing about or having witnessed a theft than children not hearing such reinforcements. In the present study, the reinforcements were uttered at seven pre-specified points during the interview. They were therefore not dependent on children's answers. For example, in the non-supportive condition, participants heard negative verbal reinforcements from the interviewer after certain answers whether these were correct or incorrect.

Similarly, one might argue that in forensic interviews, children sometimes hear combinations of positive and negative verbal reinforcements depending on their answers, making it apparent what type of responses would please the interviewer, whatever the actual reality. Our participants, in each condition, only received one form of reinforcement and only in a limited quantity. Children in the supportive condition may therefore have felt more empowered to stand by their own recollections after hearing some simple encouragements from the interviewer. In the non-supportive condition, they may have felt confused by the interviewer's comments and suggestions, which decreased their resistance to suggestive questions. It has been argued that small amounts of positive verbal reinforcement improve people's self-confidence whereas negative reinforcements increase their feeling of helplessness and lower their confidence and their motivation to do their best on a task (Seeman, Berkman, Blazer, & Rowe, 1994). All these effect may explain the present results. Furthermore, Vallerand (1987) suggested that positive verbal reinforcement has an inverted-U effect on performance. He demonstrated that participants' performance on a qualitative task gradually increased with the amount of positive verbal reinforcement they received. However, after a certain amount of

reinforcement was attained, their performance decreased. Bain, Baxter, and Fellowes (2004) argued that excessive interviewer supportiveness may make interviewees less cautious and therefore less able to notice the inconsistencies suggested by the interviewer, which would make them more suggestible. In the present study, children interviewed by the supportive interviewer received a small number of pre-specified positive verbal reinforcements. The extent of this reinforcement may have been sufficient to increase children's resistance to suggestions while not being so much as to prove detrimental. However, more research is needed to examine the point at which positive verbal reinforcement may become detrimental to children's accuracy in forensic interviews

Interviewing styles and "don't know" answers

With regards to children's tendency to answer "I don't know", the present studies (Chapters 4 and 6) showed that children interviewed by the supportive interviewers reported not knowing an answer more often than children interviewed by the non-supportive interviewer. Few studies have investigated children's "don't know" responses simply because children tend not to spontaneously give such an answer (Lamb, Sternberg, & Esplin, 1998; Memon & Vartoukian, 1996). A study by Howie and Dowd (1996) showed that seven- to ten-year-old children who were told before an interview that they were not expected to know all the answers, responded with "I don't know" significantly more than children told that they should know all the answers. By being told that it was acceptable not to know an answer, children might have felt more assertive and empowered to do so. Furthermore, Waterman, Blades, and Spencer (2004) demonstrated that five- to nine-year-old children were less likely to say "I don't know" to an interviewer whom they believed already knew the answers than to interviewers who did not hold prior knowledge about the event

they were being questioned about. Therefore, children's tendency to answer with "I don't know" can be affected by social factors.

The present results do not support Carter *et al.*'s (1996) findings that interviewer-provided social support had no effect on children's numbers of "don't know" responses. In the present studies, children were explicitly told in both the supportive and non-supportive conditions that they should say "I don't know" rather than try to answer a question to which they did not know the answer. The positive effects of supportive interviewer behaviours might therefore have made children feel more at ease and confident whereas in the non-supportive conditions, children, feeling more vulnerable and anxious, might have felt more compelled to give an answer even if they did not know it (Perry & Wrightsman, 1991). Mulder and Vrij (1996) argued that telling children that "I don't know" is an acceptable answer during forensic interviews should significantly reduce their suggestibility. This, combined with the explicit instructions which encouraged or allowed "don't know" answers from children, may have led to the present findings. However, it should be noted that, to meet the aims of a forensic interview (i.e., discover the truth), "I don't know" answers are not always desirable, as, for example, when a child knows the answer to a question but simply says that he or she does not know it.

Interviewing styles and answers to the 'touch' question

The effects of interviewing manner on children's answers to the 'touch' question (i.e., where on your body did the lady touch you to feel the vibrations?) were clear. In both studies, all the children who incorrectly reported having been touched by the adult during the learning activity had been interviewed by the non-supportive interviewers. As nothing particular in the structure of the question could account for this bias (other questions referred to the children's body and the same

question was asked in both supportive and non-supportive conditions), it was arguably due to the effects of the interviewer's non-supportive behaviour when the question was asked. The diversity of children's answers to this question also showed inconsistencies with the action of the event (i.e., feeling the vibrations of a sound) with touches reported on the knee, the arm and the forehead. Previous studies have shown that children usually do not falsely report that they have been touched. For example, Saywitz, Goodman, Nicholas, and Moan (1991) interviewed five- and seven-year-old girls about a physical examination and found that almost none of them incorrectly assented to a question about a genital touch. Likewise, Tobey and Goodman (1992) showed that four-year-old children did not falsely claim to have been kissed on the mouth by a nurse. However, these studies asked children for an abuse-related touch, that is, a touch or action on a very intimate part of their body. Such touches may be more salient to children than an innocuous touch to feel vibrations on the throat. A study by Krackow and Lynn (2003) showed that four- to six-year-old children were more likely to incorrectly acquiesce to questions about innocuous touches happening during a game of Twister (e.g., did Amy touch your arm?) than to questions concerning abuse touches (e.g., did Amy touch your bottom?). The present study questioned children about an innocuous touch which could have taken place during the event and none of the children reported having been touched in a place that would raise concerns. Nevertheless, determining the truthfulness of children's reports of bodily touches is clearly important for abuse investigators and it is encouraging that in the present study none of the children in the supportive conditions falsely claimed to having been touched, confirming the positive effects of interviewer-provided social support.

Information about an event is not stored uniformly in our memory (Ibabe & Sporer, 2004). Information concerning central details of an event is usually more readily accessible than information about peripheral details and, therefore, more difficult to distort (Christianson & Loftus, 1991). In Chapters 4 and 6, we explored the effects of question details (i.e., central and peripheral) on children's answers. Similarly to previous studies (e.g., Candel, Merckelbach, Jelicic, Limpens, & Widdershoven, 2004; Wright & Stroud, 1998), we found that children were more accurate on questions concerning central details of the learning activity than on questions referring to peripheral details. They were also more easily misled on questions about peripheral details than on those about central details. Central details are usually easier to remember because they refer to important elements of a to-be-remembered event; without them the storyline would be different.

Furthermore, the attentional narrowing hypothesis stated that central details are better remembered because they produce more emotion at encoding which tends to direct most of the attentional resources towards them (Christianson, 1992). Such a mechanism leaves few resources for the less emotional peripheral information which is then less well encoded and therefore less well remembered (Roebbers & Schneider, 2000). For example, in a gun robbery, witnesses' attention tends to focus on the object provoking their emotions (i.e., the gun) rather than on more secondary information (e.g., features of the robber, clothes). However, in the present studies, the to-be-remembered event is unlikely to have generated enough emotion at encoding to produce such an effect. The post-stimulus elaboration hypothesis stated that people tend to talk and think more about the central actions and characters of an event than about its peripheral details (Christianson, Loftus, Hoffman, & Loftus,

1991). This elaboration helps people rehearse the information which makes it more easily remembered later on. Finally, it has been argued that, in some situations, heightened anxiety may hinder the encoding of peripheral details by fragmenting memory traces and facilitate the encoding of central details which are exaggerated in memory (Ornstein, 1995). These hypotheses helped explain the present finding regarding question details and children's accuracy.

Interviewing Styles and Anxiety

The present studies showed an effect of interviewing style on children's state anxiety levels with those interviewed by the supportive interviewer reporting feeling less anxious after the interview than before while children in the non-supportive condition felt more anxious throughout the course of the interview. Because state anxiety reacts to changes in the immediate context (Spielberger, 1972), it was sensitive to different interviewer behaviours. The more pleasant environment created in the supportive conditions may have put children more at ease and, as a consequence, made them feel less nervous. On the contrary, in the non-supportive interviews, participants, feeling more vulnerable and oppressed, became more anxious. This is in line with Carter *et al.*'s (1996) hypothesis which stated that children should be less anxious when an interviewer behaves in a supportive, as opposed to a non-supportive, manner. This finding is important for applied procedures. It is known that forensic interviews are unpleasant experiences for children. Simply by adopting certain behaviours, the interviewer can affect the interviewees' feelings about the situation (Davis & Bottoms, 2002). That is, by being more supportive, the interviewer can make children feel more comfortable and less anxious. In this more positive environment, they are likely to report more

information of better quality (Goodman *et al.*, 1991) and, as the present studies demonstrated, to be better able to resist misleading information.

Anxiety, Memory and Suggestibility

Clark and Wells (1995) argued that an anxious person's performance can be diminished by anxiety because of processes such as intrusive thoughts and worry. They stated that anxious people are so preoccupied with their internal sensations and their meanings that they become relatively inattentive to whatever is going on around them. These anxious individuals, their mind full of interfering negative thoughts about themselves and their capacities, with both their self-confidence and their efficacy undermined, would be expected to perform poorly on a cognitively demanding task such as answering questions (Wells, 2005). The findings of the present studies are also in line with the processing efficiency theory (Eysenck & Calvo, 1992), suggesting that highly anxious children might have had fewer cognitive resources available to allocate to the more difficult aspects of the task at hand (i.e., dealing with misleading questions).

The present studies found that anxiety was related to children's suggestibility (i.e., their resistance to suggestive questions), but not to accuracy scores. This too, may be best explained in terms of differences in levels of cognitive resources required to answer misleading and non-misleading questions. According to the discrepancy detection principle (Tousignant, Hall, & Loftus, 1986), memories are less likely to be transformed when one directly detects discrepancies between the original memory and the misinformation (Schooler & Loftus, 1986). Undetected discrepancies may lead to source misattributions errors, that is, recalling items that were only suggested (Zaragoza & Lane, 1994). Retrieving answers to non-

misleading questions should therefore be, cognitively speaking, a less demanding task than undertaking a memory search to compare misleading information provided by an interviewer with what was initially witnessed. The difference in difficulty, and hence cognitive resources required, may explain the findings that anxiety was only related to participants' suggestibility scores and not their memory accuracy scores. However, further analyses showed no mediating effect of anxiety between interviewing style and children's resistance to suggestive questions as proposed by Carter *et al.* (1996). Although these findings are in line with Davis and Bottoms' (2002), it should nevertheless not be concluded that anxiety does not affect children's testimonies under any circumstances. It can be argued that the anxiety felt by the children in the present study was not strong enough to uncover its possible mediating role. That is, the non-supportive condition may not have produced enough anxiety in children to affect memory. However, for obvious ethical reasons, it is difficult to find ways of generating anxiety during questioning without provoking unnecessary and excessive stress in child participants.

Limitations of the Present Studies and Ideas for Future Research

As argued throughout this thesis, adults should not infer what children may understand of a situation but rather ask them for their views. While the studies reported in Chapters 3 and 5 provided data regarding children's perceptions of interviewers displaying different nonverbal and verbal behaviours, no data of how adults may have perceived these same behaviours was gathered. Although this was beyond the scope of the present thesis, future research may want to include this. Such data would permit an absolute comparison between adults and children's

perceptions of an identical situation and an examination of possible differences and similarities.

In the present studies, anxiety was measured with the STAI-C and, although this test has good validity and reliability (Spielberger, 1973), its construct has been questioned. Kelly (2004) argued that the trait scale of the STAI comprised a 'worry' component which should actually be considered separately from trait anxiety (Davey, Hampton, Farrell, & Davidson, 1992). To overcome such problems, previous studies have sometimes measured arousal using participants' physiological responses such as heart rate, blood pressure or palm sweating. For example, Quas and Lench (2007) measured children's heart rate while encoding and retrieving information from a fear eliciting video clip. Children with higher heart rate at encoding answered fewer questions incorrectly while those with higher heart rate at retrieval answered more questions incorrectly but only when interviewed by a non-supportive interviewer. Such measures may be more appropriate and accurate to investigate the relationship between witnesses' arousal and suggestibility. Furthermore, although, children's anxiety during the learning activity was not recorded, it is unlikely to have been stressful. The information children encoded was therefore probably neutral in nature. In forensic interviews, children are usually questioned about highly stressful events. As Quas and Lench (2007) and Ridley and Clifford (2004) demonstrated, it is the combination of anxiety felt at both encoding and retrieval that may influence children's testimonies.

The present studies investigated children's perception of three nonverbal and three verbal behaviours and only some of these behaviours were tested in interviews with children. Although it was argued that examining the effects of too many behaviours simultaneously may confound their specific impact, the list of behaviours

studied here is by no means exhaustive. We nevertheless believe we have chosen the behaviours adequately. However, other non-studied interviewer behaviours might be of greater influence in forensic interviews with children. Therefore, future research may want to focus on different verbal or nonverbal behaviours in order to improve our understanding of what they represent to children and of their exact effects on child witnesses' accuracy and suggestibility.

Conclusion

The present studies highlighted the importance of social factors, such as interviewer nonverbal and verbal behaviours, in forensic interviews with children. It was demonstrated that different interviewing styles had significant effects on children's perceptions of the interviewer and on their suggestibility. Children showed a strong ability to accurately reject misinformation, which further increased our confidence that they can be quite resistant to misleading suggestions. The present results may also help understand the processes at play in real court cases. In court interviews, one would expect a child witness to be questioned by a supportive prosecution attorney and cross-examined by a non-supportive defence lawyer. The impact of these two types of interviewing manner on a witness' testimony is an important research subject as it is at play in everyday court cases. Furthermore, it is not yet possible to differentiate between children who would be competent witnesses and those who would not. Therefore, research should continue to identify and investigate social variables and behaviours that may influence children's reports (Bottoms, Quas, & Davis, in press). Interviewer behaviour is a variable that is more easily controllable in interviews than other characteristics of importance to suggestibility such as age or cognitive capacities. Investigating and understanding

their effects on children's testimonies should allow professionals to control and manipulate them in forensic interviews so as to increase the reliability of eyewitness reports (Roberts, Lamb, & Sternberg, 2004). It should also help to develop more appropriate and less stressful practical procedures for interviewing children who have been witnesses or victims of sometimes highly traumatising crimes and for obtaining the best possible information from them by facilitating their report.

References

- Ackil, J.K., & Zaragoza, M. (1995). Developmental differences in eyewitness suggestibility and memory for source. *Journal of Experimental Child Psychology*, 60, 57-83.
- Almerigogna, J., Ost, J., Bull, R., & Akehurst, L. (2007). A state of high anxiety: How non-supportive interviewers can increase the suggestibility of child witnesses. *Applied Cognitive Psychology*, 21(7), 963-974.
- Argyle, M. (1972). *The psychology of interpersonal behaviour*. Harmondsworth, UK: Penguin Books.
- Baddeley, A. (1997). *Human memory: Theory and practice*. Hove, UK: Psychology Press.
- Bahrlick, L.E., Parker, J.F., Fivush, R., & Levitt, M. (1998). The effects of stress on young children's memory for a natural disaster. *Journal of Experimental Psychology: Applied*, 4(4), 308-331.
- Baillargeon, R. (2000). *How do infants learn about the physical world?* Oxford, UK: Blackwell.
- Bain, S.A., & Baxter, J.S. (2000). Interrogative suggestibility: The role of interviewer behaviour. *Legal and Criminological Psychology*, 5, 123-133.
- Bain, S.A., Baxter, J.S., & Fellowes, V. (2004). Interacting influences on interrogative suggestibility. *Legal and Criminological Psychology*, 9, 239-252.
- Banse, R., & Scherer, K. (1996). Acoustic profiles in vocal emotion expression. *Journal of Personality and Social Psychology*, 70, 614-636.
- Barlow, D.H. (2002). *Anxiety and its disorders*. New York: Guildford Press.

- Baron, R.M., & Kenny, D.A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173-1182.
- Bartlett, F.C. (1932). *Remembering*. Cambridge, UK: Cambridge University Press.
- Beattie, G. (2004). *Visible thought: The new psychology of body language*. Hove, UK: Routledge
- Beck, A.T. (1976). *Cognitive therapy and the emotional disorders*. New York: International Universities Press.
- Beck, A.T., & Clark, D.A. (1988). Anxiety and depression: An information processing perspective. *Anxiety Research*, 1, 23-36.
- Beck, A.T., Emery G., & Greenberg, R.L. (1985). *Anxiety disorders and phobias: A cognitive perspective*. New York: Basic books.
- Bekerian, D.A., & Bowers, J.M. (1983). Eyewitness testimony: Were we misled? *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 9(1), 139-145.
- Belli, R.F., Lindsay, D.S., Gales, M.S., & McCarthy, T.T. (1994). Memory impairment and source misattribution in postevent misinformation experiments with short retention intervals. *Memory and Cognition*, 22(1), 40-54.
- Biederman, G.B., Davey, V.A., Ryder, C., & Franchi, D. (1994). The negative effects of positive reinforcement in teaching children with developmental delay. *Exceptional Children*, 60(5), 458-465.
- Biersack, S., & Kempe, V. (2005). Tracing vocal expression of emotion along the speech chain: Do listeners perceive what speakers feel? *Plasticity in Speech Perception*, 211-214.

- Billings, F., Taylor, T., Burns, J., Corey, D., Garven, S., & Wood, J. (2007). Can reinforcement induce children to falsely incriminate themselves? *Law and Human Behavior*, 31(2), 125-139.
- Blank, H. (1998). Memory states and memory tasks: An integrative framework for eyewitness memory and suggestibility. *Memory*, 6, 481-529.
- Bless, H., Strack, F., & Walther, E. (2001). Memory as a target of social influence? Memory distortions as a function of social influence and meta-cognitive knowledge. In J.P. Forgas, & K.D. Williams (Eds.), *Social influence: Direct and indirect processes* (pp. 167-189). Philadelphia: Psychology Press.
- Boone, R.T., & Cunningham, J.G. (1998). Children's decoding of emotion in expressive body movement: The development of cue attunement. *Developmental Psychology*, 34, 1007-1016.
- Boring, E.G. (1991). The history of introspection: II. *Vestnik Moskovskogo Universiteta – Seriya 14: Psikhologiya*, 3, 54-63.
- Bortfeld, H., Leon, S.D., Bloom, J.E., Schober, M.F., & Brennan, S.E. (2001). Disfluency rates in spontaneous speech: Effects of age, relationship, topic, role, and gender. *Language and Speech*, 44, 123-149.
- Bottoms, B.L., Quas, J.A., & Davis, S.L. (in press). The influence of interviewer-provided social support on children's suggestibility, memory, and disclosures. In M.E. Pipe, M. Lamb, Y. Orbach, & A.C. Cedarborg (Eds.), *Child sexual abuse: Disclosure, delay and denial*. Mahwah, NJ: Erlbaum.
- Bower, G.H. (1981). Mood and memory. *American Psychologist*, 36, 129-148.
- Bower, G.H., Gilligan, S.G., & Monteiro, K.P. (1981). Selectivity of learning caused by affective states. *Journal of Experimental Psychology: General*, 110, 451-473.
- Boyatzis, C.J., & Satyaprasad, C. (1994). Children's facial and gestural decoding and encoding: Relationships between skills and with popularity. *Journal of Nonverbal Behavior*, 18, 37-55.

- Brainerd, C.J., & Ornstein, P.A. (1991). Children's memory for witnessed events. In J. Doris (Ed.), *The suggestibility of children's memory* (pp. 10-20). Washington, DC: American Psychological Press.
- Brainerd, C.J., Reyna, V.F., Howe, M.L., & Kingma, J. (1990). The development of forgetting and reminiscence. *Monographs of the Society for Research in Child Development*, 55, (3-4 Serial No. 222).
- Brennan, S.E., & Schober, M.F. (2001). How listeners compensate for disfluencies in spontaneous speech. *Journal of Memory and Language*, 44, 274-296.
- Brewer, W.F. (1997). Children's eyewitness memory research: Implications from schema memory and autobiographical memory research. In N.L. Stein, P.A. Ornstein, B. Tversky, & C. Brainerd (Eds.), *Memory for everyday and emotional events* (pp. 453-466). Mahwah, NJ: Erlbaum.
- Broadbent, D.E., & Broadbent, M. (1988). Anxiety and attentional bias: State and trait. *Cognition and Emotion*, 2, 165-183.
- Brooks, C.I., Church, M.A., & Fraser, L. (1986). Effects of duration of eye contact on judgments of personality characteristics. *Journal of Social Psychology*, 126(1), 71-78.
- Brown, R., & Kulik, J. (1977). Flashbulb memories. *Cognition*, 5, 73-99.
- Bruchon-Schweitzer, M.L., & Paulhan, I. (1990). *Manuel pour l'inventaire d'anxiété état-trait (forme Y)*. Paris: Editions du Centre de Psychologie Appliquée.
- Bruck, M., & Melnyk, L. (2004). Individual differences in children's suggestibility: A review and synthesis. *Applied Cognitive Psychology*, 18(8), 947-996.

- Bull, R. (1998). Obtaining information from child witnesses. In A. Memon, A. Vrij, & R. Bull (Eds.), *Psychology and law: Truthfulness, accuracy, and credibility* (pp. 188–209). Maidenhead, UK: McGraw-Hill.
- Burgoon, J.K., & Walther, J.B. (1990). Nonverbal expectancies and the evaluative consequences of violations. *Human Communication Research*, 77, 232-265.
- Burgoon, J.K., Buller, D.B., Hale, J.L., & deTurck, M.A. (1984). Relational messages associated with nonverbal behaviors. *Human Communication Research*, 10, 351-378.
- Burke, A., Heuer, F., & Reisberg, D. (1992). Remembering emotional events. *Memory and Cognition*, 20, 277-290.
- Burleson, B.R., Albrecht, T.L., Goldsmith, D.J., & Sarason, I.G. (1994). The communication of social support. In B.R. Burleson, T.L. Albrecht, & I.G. Sarason (Eds.), *Communication of social support* (pp. xi-xxx). Thousand Oaks, CA: Sage.
- Calvo, M.G., & Castillo, M.D. (2001). Selective interpretation in anxiety: The role of uncertainty of threatening events. *Cognition and Emotion*, 15, 299-320.
- Candel, I., Merckelbach, H., Jelicic, M., Limpens, M., & Widdershoven, K. (2004). Children's suggestibility for peripheral and central details. *Journal of Credibility Assessment and Witness Psychology*, 5(1), 9-18.
- Candel, I., Merckelbach, H., & Muris, P. (2000). Measuring interrogative suggestibility in children: Reliability and validity of the Bonn Test of Statement Suggestibility. *Psychology, Crime, and Law*, 6, 61-70.
- Cardone, D., & Dent, H. (1996). Memory and interrogative suggestibility: The effects of modality of information presentation and retrieval conditions upon the suggestibility scores of people with learning disabilities. *Legal and Criminological Psychology*, 1, 165-177.

- Carter, C., Bottoms, B., & Levine, M. (1996). Linguistic and socioemotional influences on the accuracy of children's reports. *Law and Human Behavior*, 20, 335-358.
- Cattell, R.B. (1966). The scree test for the number of factors. *Multivariate Behavioral Research*, 1(2), 245-276.
- Cattell, R.B., & Scheier, I.H. (1961). *The meaning and measurement of neuroticism and anxiety*. New York: Ronald Press.
- Ceci, S.J. (1996). *On intelligence: A bioecological treatise on intellectual development*. Englewood Cliffs, NJ: Prentice Hall.
- Ceci, S.J., & Bruck, M. (1993). Suggestibility of the child witness: A historical review and synthesis. *Psychological Bulletin*, 113(3), 403-439.
- Ceci, S.J., Crossman, A.M., Scullin, M.H., Gilstrap, L.L., & Huffman, M.L. (2002). Children's suggestibility research: Implications for the courtroom and the forensic interview. In H.L. Westcott, G.M. Davies, & R.H.C. Bull (Eds.), *Children's testimony: A handbook of psychological research and forensic practice* (pp. 117-130). Chichester, UK: Wiley.
- Ceci, S.J., DeSimone, M., Putnick, M., Lee, J.M., & Toglia, M. (1990, March). *Motives to lie*. Williamsburg, VA: Paper presented at the biennial meeting of the American Psychology/Law Society.
- Ceci, S.J., Huffman, M.L., & Smith, E. (1994). Repeatedly thinking about a non-event: Source misattribution among preschoolers. *Consciousness and Cognition*, 3, 388-407.
- Chae, Y., & Ceci, S.J. (2005). Individual differences in children's recall and suggestibility: The effect of intelligence, temperament, and self-perceptions. *Applied Cognitive Psychology*, 19, 383-407.

- Chen, E., Zeltzer, L.K., Craske, M.G., & Katz, E.R. (2000). Children's memories for painful cancer treatment procedures: Implications for distress. *Child Development, 71*, 933-947.
- Christiaansen, R.E., & Ochalek, K. (1983). Editing misleading information from memory: Evidence for the coexistence of original and postevent information. *Memory and Cognition, 11*(5), 467-475.
- Christianson, S.A. (1992). Emotional stress and eyewitness memory: A critical review. *Psychological Bulletin, 112*, 284-309.
- Christianson, S.A., & Loftus, E.F. (1991). Remembering emotional events: The fate of detailed information. *Emotion and Cognition, 5*, 81-108.
- Christianson, S.A., Loftus, E.F., Hoffman, H., & Loftus, G.R. (1991). Eye fixations and accuracy in detail memory for emotional versus neutral events. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 17*, 693-701.
- Clark, D.M., & Wells, A. (1995). A cognitive model of social phobia. In R.G. Heimberg, M.R. Liebowitz, D.A. Hope, & F.R. Schneier (Eds.), *Social phobia: Diagnosis, assessment and treatment* (pp. 69-93). New York: Guilford Press.
- Clark, H.H., & Fox Tree, J.E. (2002). Using uh and um in spontaneous speaking. *Cognition, 84*, 73-111.
- Cook, M. (1971). *Interpersonal perception*. Harmondsworth, UK: Penguin Books.
- Crews, F. (1995). *The memory wars: Freud's legacy in dispute*. New York: New York Review Books.
- Cross, R. (2000, August). *More than an answer: How seeking information through people facilitates knowledge creation and use*. Toronto, Canada: Paper presented at the Academy of Management Conference.

- Cutrona, C.E., & Russell, D.W. (1990). Type of social support and specific stress: Toward a theory of optimal matching. In S.R. Sarason, I.G. Sarason, & G.R. Pierce (Eds.), *Social support: An interactional view* (pp. 319-366). New York: Wiley.
- Davey, C.L., Hampton, J., Farrell, J., & Davidson, S. (1992). Some characteristics of worrying: Evidence for worrying and anxiety as separate constructs. *Personality and Individual Differences*, 13, 133-147.
- Davies, G.M., & Westcott, H.L. (1999). *Interviewing child witnesses under the Memorandum of Good Practice: A research review*. London: Home Office.
- Davis, S.L., & Bottoms, B.L. (2002). Effects of social support on children's eyewitness reports: A test of the underlying mechanism. *Law and Human Behavior*, 26, 185-215.
- Deffenbacher, J.L. (1978). Worry, emotionality and task-generated interference in test anxiety: An empirical test of attentional theory. *Journal of Educational Psychology*, 70, 248-254.
- Deffenbacher, K.A., Bornstein, B.H., Penrod, S.D., & McGorty, E.K. (2004). A meta-analytic review of the effects of high stress on eyewitness memory. *Law and Human Behavior*, 28, 687-706.
- DePaulo, B.M., & Coleman, L.M. (1987). Verbal and nonverbal communication of warmth to children, foreigners, and retarded adults. *Journal of Nonverbal Behavior*, 11, 75-88.
- Deutsch, F.M. (1990). Status, sex and smiling: The effect of role on smiling in men and women. *Personality and Social Psychology Bulletin*, 16, 531-540.
- Doerksen, S.R., & Shimamura, A.P. (2001). Source memory enhancement for emotional words. *Emotion*, 1, 5-11.
- Donaldson, M. (1978). *Children's minds*. London: Fontana.

- Dorr, D. (1981). Factor structure of the State-Trait Anxiety Inventory for Children. *Personality and Individual Differences*, 2(2), 113-117.
- Egloff, B., & Hock, M. (2001). Interactive effects of state anxiety: The role of emotional Stroop interference. *Personality and Individual Differences*, 31, 875-882.
- Eisen, M.L., Qin, J., Goodman, G.S., & Davis, S.L. (2002). Memory and suggestibility in maltreated children: Age, stress arousal, dissociation, and psychopathology. *Journal of Experimental Child Psychology*, 83(3), 167-212.
- Engelberg, E., & Christianson, S.A. (2001). Stress, trauma, and memory. In M.L. Eisen, J.A. Quas, & G.S. Goodman (Eds.), *Memory and suggestibility in the forensic interview* (pp. 143-163). Mahwah, NJ: Erlbaum.
- Erdelyi, M.H. (2006). The unified theory of repression. *Behavioral and Brain Sciences*, 29(5), 499-511.
- Estes, W.K. (1997). Processes of memory loss, recovery, and distortion. *Psychological Review*, 104, 148-169.
- Ettinger, R.H., Crooks, R.L., & Stein, J. (1994). *Psychology: Science, behavior, and life*. Fort Worth, TX: Harcourt Brace.
- Eysenck, H.J., & Rachman, S. (1965). *The causes and cures of neurosis*. London: Routledge.
- Eysenck, M.W. (1992). *Anxiety: The cognitive perspective*. Hove, UK: Erlbaum.
- Eysenck, M.W. (1997). *Anxiety and cognition: A unified theory*. Hove, UK: Psychology Press.
- Eysenck, M.W., & Calvo, M. (1992). Anxiety and performance: The processing efficiency theory. *Cognition and Emotion*, 6, 409-434.

- Eysenck, M.W., Mogg, K., May, J., Richards, A., & Mathews, A. (1991). Bias in interpretation of ambiguous sentences related to threat in anxiety. *Journal of Abnormal Psychology, 100*, 144-150.
- Farber, I.E., & Spence, K.W. (1953). Complex learning and conditioning as a function of anxiety. *Journal of Experimental Psychology, 45*, 120-125.
- Farrar, M.J., & Goodman, G.S. (1992). Developmental changes in event memory. *Child Development, 63*(1), 173-187.
- Farroni, T., Menon, E., Rigato, S., & Johnson, M.H. (2007). The perceptions of facial expressions in newborns. *European Journal of Developmental Psychology, 4*(1), 2-13.
- Fisher, R.P., & Geiselman, R.E. (1992). *Memory enhancing techniques for investigative interviewing: The cognitive interview*. Springfield, IL: Charles C. Thomas.
- Fleiss, J.L. (1981). *Statistical methods for rates and proportions*. New York: Wiley.
- Foa, E.B., & Kozac, M.J. (1986). Emotional processing of fear: Exposure to corrective information. *Psychological Bulletin, 99*, 20-35.
- Freud, S. (1949). *Introductory lectures on psycho-analysis*. London: George Allen and Unwin Ltd.
- Freud, S. (1950). The analysis of a phobia in a five-year-old boy. *Collected papers of Freud, Vol. 3*. London: Hogarth Press.
- Fukuhara, S. (1990). The effect of eye contact and verbal content about impression on affective reactions of the other partner. *Shinrigaku Kenkyu, 61*(3), 177-183.
- Garven, S., Wood, J.M., & Malpass, R.S. (2000). Allegations of wrongdoing: The effects of reinforcement on children's mundane and fantastic claims. *Journal of Applied Psychology, 85*(1), 38-49.

- Garven, S., Wood, J.M., Malpass, R.S., & Shaw, J.S. (1998). More than suggestion: The effect of interviewing techniques from the McMartin Preschool case. *Journal of Applied Psychology*, 83, 347-359.
- Geddie, L.F., Fradin, S., & Beer, J. (2000). Child characteristics which impact accuracy of recall and suggestibility in preschoolers: Is age the best predictor? *Child Abuse and Neglect*, 24, 223-235.
- Gilboa, D., & Greenbaum, C.W. (1978). Adults' warmth, type of verbal reinforcer, and children's learning. *Psychological Reports*, 43, 223-226.
- Gilligan, S.G., & Bower, G.H. (1984). Cognitive consequences of emotional arousal. In C. Izard, J. Kagan, & R.B. Zajonc (Eds.), *Emotions, cognition, and behavior* (pp. 547-588). New York: Cambridge University Press.
- Goodman, G.S., & Melinder, A. (2007). Child witness research and forensic interviews of young children: A review. *Legal and Criminological Psychology*, 12(1), 1-19.
- Goodman, G.S., & Reed, R. (1986). Age differences in eyewitness testimony. *Law and Human Behavior*, 10, 317-332.
- Goodman, G., Bottoms, B., Schwartz-Kenney, B., & Rudy, L. (1991). Children's testimony for a stressful event: Improving children's reports. *Journal of Narrative and Life History*, 1, 69-99.
- Goodman, G.S., Hirschman, J.E., Hepps, D., & Rudy, L. (1991). Children's memory for stressful events. *Merrill Palmer Quarterly*, 37, 109-158.
- Goodman, G.S., Jones, D.P.H., Pyle, E.A., Prado-Estrada, L., Port, L.K., England, P., Mason, R., & Rudy, L. (1988). The emotional effects of criminal court testimony on child sexual assault victims: A preliminary report. In G.M. Davies, & J. Drinkwater (Eds.), *The child witness: Do the courts abuse children?* (pp. 46-54). Leicester, UK: British Psychological Society Press.

- Goodman, G.S., Quas, J.A., Batterman-Faunce, J.M., Riddlesburger, M.M., & Kuhn, J. (1994). Predictors of accurate and inaccurate memories of traumatic events experienced in childhood. *Consciousness and Cognition*, 3, 269-294.
- Gordon, B.N., Baker-Ward, L., & Ornstein, P.A. (2001). Children's testimony: A review of research on memory for past experiences. *Clinical Child and Family Psychology Review*, 4(2), 157-181.
- Graf, P., & Mandler, G. (1984). Activation makes words more accessible, but not necessarily more retrievable. *Journal of Verbal Learning and Verbal Behavior*, 23, 553-568.
- Grahe, J.E., & Bernieri, F.J. (1999). The importance of nonverbal cues in judging rapport. *Journal of Nonverbal Behaviour*, 23(4), 253-269.
- Gray, J.A. (1982). *The neuropsychology of anxiety: An enquiry into the functions of the septo-hippocampal system*. Oxford: Oxford University Press.
- Gray, J.A. (1986). The neuropsychology of anxiety. In C.D. Spielberger, & I.G. Sarason (Eds.), *Stress and anxiety* (pp. 3-26). Washington, DC: Hemisphere.
- Gray, J.A. (1987). *Psychology of fear and stress*. Cambridge: Cambridge University Press.
- Greene, E., Flynn, M.S., & Loftus, E.F. (1982). Inducing resistance to misleading information. *Journal of Verbal Learning and Verbal Behavior*, 21, 207-219.
- Greenstock, G., & Pipe, M.E. (1996). Interviewing children about past events: The influence of peer support and misleading questions. *Child Abuse and Neglect*, 20, 69-80.
- Greenstock, G., & Pipe, M.E. (1997). Are two heads better than one? Peer support and children's eyewitness reports. *Applied Cognitive Psychology*, 11, 461-483.

- Gudjonsson, G.H. (1984). A new scale of interrogative suggestibility. *Personality and Individual Differences*, 5, 303-314.
- Gudjonsson, G.H. (1988). Interrogative suggestibility: Its relationship with assertiveness, social-evaluative anxiety, state anxiety and method of coping. *British Journal of Clinical Psychology*, 27, 159-166.
- Gudjonsson, G.H. (1992). *The psychology of interrogations, confessions and testimony*. New York: Wiley.
- Gudjonsson, G.H., Rutter, S.C., & Clare, I.C.H. (1995). The relationship between suggestibility and anxiety among suspects detained at police stations. *Psychological Medicine*, 25, 875-878.
- Hall, E.T. (1959). *The silent language*. Greenwich, CT: Fawcett.
- Harrigan, J.A., Gramata, J.F., Lucic, K.S., & Margolis, C. (1989). It's how you say it: Physicians' vocal behavior. *Social Science and Medicine*, 28(1), 87-92.
- Harris, M., & Butterworth, G. (2002). *Developmental psychology*. Hove, UK: Psychology Press.
- Harris, M.J., & Rosenthal, R. (1985). Mediation of interpersonal expectancy effects: Thirty-one meta-analyses. *Psychological Bulletin*, 97, 363-386.
- Hedl, J.J., & Papay, J.P. (1982). The factor structure of the State-Trait Anxiety Inventory for Children: Kindergarten through the fourth grades. *Personality and Individual Differences*, 3(4), 439-446.
- Hembree, R. (1988). Correlates, causes, effects, and treatment of test anxiety. *Review of Educational Research*, 58, 7-77.

- Henry, L.A., & Gudjonsson, G.H. (2003). Eyewitness memory, suggestibility, and repeated recall sessions in children with mild and moderate intellectual disabilities. *Law and Human Behavior*, 27(5), 481-505.
- Henson, R.N.A. (1998). Item repetition in short-term memory: Ranschburg repeated. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 24(5), 1162-1181.
- Home Office (2002). *Achieving best evidence in criminal proceedings: Guidance for vulnerable or intimidated witnesses, including children*. London: Her Majesty's Stationery Office.
- Hortaçsu, N., & Ekinçi, B. (1992). Children's reliance on situational and vocal expression of emotions: Consistent and conflicting cues. *Journal of Nonverbal Behavior*, 16, 231-247.
- House, J.S. (1981). *Work stress and social support*. Reading, MA: Addison-Wesley.
- Howe, M.L. (2000). *The fate of early memories: Developmental science and the retention of childhood experiences*. Washington, DC: American Psychological Press.
- Howie, P.M., & Dowd, H.J. (1996). Self-esteem and the received obligation to respond: Effects on children's testimony. *Legal and Criminological Psychology*, 1, 197-209.
- Howie, P., Barbouttis, F., Schmidhofer, K., Bjelosovic, D., & McInnes, K. (2002). "Draw me what happened!": The effects of drawing and social support on young children's memory for past events. Queensland, Australia: Paper presented at the Annual Conference of the Australian Psychological Society.
- Ibabe, I., & Sporer, S.L. (2004). The influence of question form on the accuracy and confidence of memories for central and peripheral action and descriptive details of an event. *Applied Cognitive Psychology*, 18, 711-726.

- Imhoff, M., & Baker-Ward, L. (1999). Preschoolers' suggestibility: Effects of developmentally appropriate language and supportiveness. *Journal of Applied Developmental Psychology, 20*, 407-429.
- Johnson, S.P. (1997). Young infants' perception of object unity: Implications for development of attentional and cognitive skills. *Current Directions in Psychological Science, 6*, 5-11.
- Kahneman, D., Triesman, A., & Burkell, J. (1983). The cost of visual filtering. *Journal of Experimental Psychology: Human Perception and Performance, 9*, 510-522.
- Kail, R.V. (1989). *The development of memory in children*. New York: Freeman.
- Kassin, S. (1997). The psychology of confession evidence. *American Psychologist, 52*, 221-233.
- Keating, L.M., Tomishima, M.A., Foster, S., & Alessandri, M. (2002). The effects of a mentoring program on at-risk youth. *Adolescence, 37*, 717-735.
- Kelley, D.H., & Gorham, J. (1988). Effects of immediacy on recall of information. *Communication Education, 37*, 198-207.
- Kelly, W.E. (2004). Examining the relationship between worry and trait anxiety. *College Student Journal, 38*, 370-373.
- Knapp, M.L., & Hall, J.A. (1992). *Nonverbal communication in human interaction*. Fort Worth, TX: Holt, Rinehart, & Winston.
- Kohn, A. (1993). *Punished by rewards: The trouble with gold stars, incentive plans, A's, praise, and other bribes*. New York: Houghton-Mifflin.
- Krackow, E., & Lynn, S.J. (2003). Is there touch in the game of Twister? The effects of innocuous touch and suggestive questions on children's eyewitness memory. *Law and Human Behavior, 27*, 589-604

- Krähenbühl, S., & Blades, M. (2006). The effects of interviewing techniques on young children's responses to questions. *Child Care, Health and Development*, 32(3), 321-331.
- Krasner, L. (1958). Studies on the conditioning of verbal behavior. *Psychological Bulletin*, 55(3), 148-170.
- Kulkofsky, S., Wang, Q., & Ceci, S.J. (2008). Do better stories make better memories?: Narrative skills and memory accuracy in preschool children. *Applied Cognitive Psychology*, 22, 21-38.
- Lamb, M.E., Sternberg, K.J., & Esplin, P.W. (1998). Conducting investigative interviews of alleged sexual abuse victims. *Child Abuse and Neglect*, 22, 813-823.
- Leekam, S.R. (1992). Believing and deceiving: Steps to becoming a good liar. In S.J. Ceci, M.D. Leichtman, & M. Putnick (Eds.), *Cognitive and social factors in early deception* (pp. 47-62). Hillsdale, NJ: Erlbaum.
- Leichtman, M.D., & Ceci, S.J. (1995). The effects of stereotypes and suggestions on preschoolers' reports. *Developmental Psychology*, 31, 568-578.
- Lepore, S.J. (1991). Child witness: Cognitive and social factors related to memory and testimony. *Issues in Child Abuse Accusations*, 3, 65-89.
- Lepper, M.R., Woolverton, M., Mumme, D.L., & Gurtner, J. (1993). Motivational techniques of expert human tutors: Lessons for the design of computer-based tutors. In S.P. Lajoie, & S.J. Derry (Eds.), *Computers as cognitive tools* (pp. 75-105). Hillsdale, NJ: Erlbaum.
- Levitt, E.E. (1980). *The psychology of anxiety*. Hillsdale, NJ: Erlbaum.

- Lewis, M. (1993). The development of deception. In M. Lewis, & C. Saarni (Eds.), *Lying and deception in everyday life* (pp. 90-106). New York: Guildford Press.
- Lewis, M., Stranger, C., & Sullivan, M. (1989). Deception in three-year-olds. *Developmental Psychology*, 25, 439-443.
- Lindsay, D.S. (1990). Misleading suggestions can impair eyewitnesses' ability to remember event details. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 16(6), 1077-1083.
- Lindsay, D.S. (2002). Children's source monitoring. In H.L. Westcott, G.M. Davies, & R.H.C. Bull (Eds.), *Children's testimony: A handbook of psychological research and forensic practice* (pp. 83-98). Chichester, UK: Wiley.
- Lindsay, D.S., & Johnson, M.K. (1989). The eyewitness suggestibility effect and memory for source. *Memory and Cognition*, 17(3), 349-358.
- Lindsay, D.S., Johnson, M.K., & Kwon, P. (1991). Developmental changes in memory source monitoring. *Journal of Experimental Child Psychology*, 52, 297-318.
- Loftus, E.F. (1996). *Eyewitness testimony*. Cambridge, MA: Harvard University Press.
- Loftus, E.F., & Loftus, G. (1980). On the permanence of stored information in the human brain. *American Psychologist*, 35, 409-420.
- Lyon, T.D. (1999). The new wave in children's suggestibility research: A critique. *Cornell Law Review*, 84, 1004-1018.
- Machotka, P. (1965). Body movement and communication. *Dialogues: Behavioral Science Research*, 2, 33-66.
- MacLeod, C. (1999). Anxiety and anxiety disorders. In T. Dalgleish, & M.J. Power (Eds.), *Handbook of cognition and emotion* (pp. 447-477). Chichester, UK: Wiley.

- MacLeod, C., & Cohen I. (1993). Anxiety and the interpretation of ambiguity: A text comprehension study. *Journal of Abnormal Psychology, 102*, 238-247.
- MacLeod, C., & Mathews, A. (1988). Anxiety and the allocation of attention to threat. *Quarterly Journal of Experimental Psychology, 38*, 659-670.
- Malpass, R. (1996). Enhancing eyewitness memory. In S.L. Sporer, R.S. Malpass, & G. Koehnken (Eds.), *Psychological issues in eyewitness identification*. Mahwah, NJ: Erlbaum.
- Mathews, A., & MacLeod, C. (1994). Cognitive approaches to emotion and emotional disorders. *Annual Review of Psychology, 45*, 25-50.
- Matthews, G., & Harley, T.A. (1996). Connectionist models of emotional distress and attentional bias. *Cognition and Emotion, 10*, 561-600.
- McCloskey, M., & Zaragoza, M. (1985). Misleading postevent information and memory for events: Arguments and evidence against the memory impairment hypothesis. *Journal of Experimental Psychology: General, 114*, 1-16.
- McMahan, E. (1976). Nonverbal communication as a function of attribution in impression formation. *Communication Monographs, 43*, 287-294.
- Mehrabian, A. (1969). Some referents and measures of nonverbal behavior. *Behavior Research Methods and Instrumentation, 1*, 203-207.
- Mehrabian, A. (1972). *Nonverbal communication*. Chicago, IL: Aldine-Atherton.
- Memon, A., & Vartoukian, R. (1996). The effects of repeated questioning on young children's eyewitness testimony. *British Journal of Psychology, 87*, 403-415.
- Miller, P.H., & Seier, W.L. (1994). Strategy utilization deficiencies in children: When, where, and why. In H.W. Reese (Ed.), *Advances in child development and behavior* (pp. 107-156). New York: Academic Press.

- Moston, S. (1989). *Social support and the quality of children's eyewitness testimony*. University of Kent, UK: Unpublished Doctoral Thesis.
- Moston, S., & Engelberg, T. (1992). The effects of social support on children's eyewitness testimony. *Applied Cognitive Psychology*, 6, 61-75.
- Mowrer, O.H. (1939). Stimulus response theory of anxiety. *Psychological Review*, 46, 553-565.
- Mulder, M.R., & Vrij A. (1996). Explaining conversation rules to children: An intervention study to facilitate children's accurate responses. *Child Abuse and Neglect*, 20(7), 623-631.
- Murray, K. (1988). *Research paper on evidence from children: Alternatives to in-court testimony in criminal proceedings in the United States of America*. Edinburgh, Scotland: Scottish Law Commission.
- Nathanson, R., & Saywitz, K.J. (2003). The effects of the courtroom context on children's memory and anxiety. *Journal of Psychiatry and Law*, 31, 67-98.
- Neil, S.R. (1989). The effects of facial expression and posture on children's reported responses to teacher nonverbal communication. *British Educational Research Journal*, 15(2), 195-204.
- Ofshe, R. (1989). Coerced confessions: The logic of seemingly irrational action. *Cultic Studies Journal*, 6, 1-15
- Orbach, Y., & Lamb, M.E. (2000). Enhancing children's narratives in investigative interviews. *Child Abuse and Neglect*, 24, 1631-1648.
- Ornstein, P.A. (1995). Children's long term retention of salient personal experiences. *Journal of Traumatic Stress*, 8, 581-604.
- Ornstein, P.A., Gordon, B.N., & Larus, D.M. (1992). Children's memory for a personally experienced event: Implications for testimony. *Applied Cognitive Psychology*, 6, 49-60.

- Ornstein, P.A., Shapiro, L.R., Clubb, P.A., Follmer, A., & Baker-Ward, L. (1997). The influence of prior knowledge on children's memory for salient medical experiences. In N.L. Stein, P.A. Ornstein, B. Tversky, & C. Brainerd (Eds.), *Memory for everyday and emotional events* (pp. 83-111). Mahwah, NJ: Erlbaum.
- Ost, J., Vrij, A., Costall, A., & Bull, R. (2002). Crashing memories and reality monitoring: Distinguishing between perceptions, imaginations and 'false memories'. *Applied Cognitive psychology*, 16(2), 125-134.
- Otta, E., Abrosio, F., & Hoshino, R. (1996). Reading a smiling face: Messages conveyed by various forms of smiling. *Perceptual and Motor Skills*, 82, 1111-1120.
- Otteson, J.D., & Otteson, C.R. (1980). Effect of teacher's gaze on children's story recall. *Perceptual and Motor Skills*, 50, 35-42.
- Owren, M.J., & Bachorowski, J.A. (in press). Acoustic assessment of vocal expression of emotion. In J. Coan, & J. Allen (Eds.), *Handbook of emotion elicitation and assessment*. Oxford, UK: Oxford University Press.
- Oxburgh, G.E., Williamson, T., & Ost, J. (2006). Police officers' use of emotional language during child sexual abuse investigations. *Journal of Investigative Psychology and Offender Profiling*, 3, 35-45.
- Papay, J.P., & Spielberger, C.D. (1986). Assessment of anxiety and achievement in kindergarten and first- and second-grade children. *Journal of Abnormal Child Psychology*, 14(2), 279-286.
- Paris, S.G., Newman, R.S., & Jacobs, J.E. (1985). Social contexts and functions of children's remembering. In M. Pressley, & C.J. Brainerd (Eds.), *Cognitive learning and memory in children* (pp. 81-115). New York: Springer-Verlag.

- Parker, J.F. (1995). Age differences in source monitoring of performed and imagined actions on immediate and delayed tests. *Journal of Experimental Child Psychology*, 60, 84-101.
- Patterson, M.L. (1983). *Nonverbal behavior: A functional perspective*. New York: Springer-Verlag.
- Pavlov, I.P. (1941). *Conditional reflexes and psychiatry*. New York: International Publishers.
- Perry, N., & Wrightsman, L. (1991). *The child witness: Legal issues and dilemmas*. London: Sage.
- Peterson, C., & Bell, M. (1996). Children's memory for traumatic injury. *Child Development*, 67, 3045-3070.
- Pezdek, K. (2003). Event memory and autobiographical memory for the events of September 11, 2001. *Applied Cognitive Psychology*, 17, 1033-1045.
- Pillemer, D.B. (1992). Remembering personal circumstances: A functional analysis. In E. Winograd, & U. Neisser (Eds.), *Affect and accuracy in recall: Studies of flashbulb memories* (pp. 236-264). New York: Cambridge University Press.
- Pipe, M.E., & Salmon, K. (2002). What children bring to the interview context: Individual differences in children's event reports. In M.L. Eisen, J.A. Quas, & G.S. Goodman (Eds.), *Memory and suggestibility in the forensic interview* (pp. 235-261). Mahwah, NJ: Erlbaum.
- Pirolli, P.L., & Mitterer, J.O. (1984). The effects of leading questions on prior memory: Evidence for the coexistence of inconsistent traces. *Canadian Journal of Psychology*, 38, 135-141.

- Poole, D.A., & Lamb, M.E. (1998). *Investigative interviews of children: A guide for helping professionals*. Washington, DC: American Psychological Association.
- Poole, D.A., & White, L.T. (1993). Two years later: Effects of repetition and retention interval on the eyewitness testimony of children and adults. *Developmental Psychology*, 29(5), 844-853.
- Pratt, C. (1990). On asking children - and adults - bizarre questions. *First Language*, 10(29), 167-175.
- Quas, J.A., & Lench, H.C. (2007). Arousal at encoding, arousal at retrieval, interviewer support, and children's memory for a mild stressor. *Applied Cognitive Psychology*, 21, 289-305.
- Quas, J.A., Bauer, A.B., & Boyce, W.T.B. (2004). Emotion, reactivity, and memory in early childhood. *Child Development*, 75, 1-18.
- Quas, J.A., Davis, E.L., Goodman, G.S., & Myers, J.E.B. (2007). Repeated questions, deception, and children's true and false reports of body touch. *Child Maltreatment*, 12(1), 60-67.
- Quas, J.A., Qin, J., Schaaf, J., & Goodman, G.S. (1997). Individual differences in children's and adults' suggestibility and false event memory. *Learning and Individual Differences*, 9, 359-390.
- Quas, J.A., Wallin, A.R., Papini, S., Lench, H.C., & Scullin, M.H. (2005). Suggestibility, social context, and memory for a novel experience in young children. *Journal of Experimental Child Psychology*, 91, 315-341.
- Rachman, S. (2004). *Anxiety*. Hove, UK: Psychology Press.

- Rachman, S., & Cuk, M. (1992). Fearful distortions. *Behaviour Research and Therapy*, 30, 583-589.
- Rachman, S., & Lopatka, C. (1986). Do fears summate? *Behaviour Research and Therapy*, 24, 653-660.
- Reece, M., & Whitman, R. (1962). Expressive movements, warmth and verbal reinforcement. *Journal of Abnormal and Social Psychology*, 64, 234-236.
- Reisberg, D., & Heuer, F. (2007). The influence of emotion on memory in forensic settings. In M.P. Toglia, J.D. Read, D.F. Ross, & R.C.L. Lindsay (Eds.), *Handbook of eyewitness psychology* (pp. 81-116). Mahwah, NJ: Erlbaum.
- Ricci, C.M., & Beal, C.R. (1998). Child witnesses: Effects of event knowledge on memory and suggestibility. *Journal of Applied Developmental Psychology*, 19(2), 305-317.
- Ridley, A.M., & Clifford, B.R. (2004). The effects of anxious mood induction on suggestibility to misleading post-event information. *Applied Cognitive Psychology*, 18, 233-244.
- Ridley, A.M., Clifford, B.R., & Keogh, E. (2002). The effects of state anxiety on the suggestibility and accuracy of child eyewitnesses. *Applied Cognitive Psychology*, 16, 547-558.
- Roberts, K.P., & Blades, M. (2000). Discriminating between memories of television and real life. In K.P. Roberts, & M. Blades (Eds.), *Children source monitoring* (pp. 147-169). Mahwah, NJ: Erlbaum.
- Roberts, K.P., Lamb, M.E., & Sternberg, K.J. (2004). The effects of rapport-building style on children's reports of a staged event. *Applied Cognitive Psychology*, 18, 189-202.
- Rockwell, P., & Hubbard, A.E. (1999). The effect of attorney's nonverbal communication on perceived credibility. *Journal of Credibility Assessment and Witness Psychology*, 2(1), 1-13.

- Roebers, C.M., & Schneider, W. (2000). The impact of misleading questions on eyewitness memory in children and adults. *Applied Cognitive Psychology, 14*, 509-526.
- Roebers, C.M., Schwarz, S., & Neumann, R. (2005). Social influence and children's event recall and suggestibility. *European Journal of Developmental Psychology, 2*(1), 47-69.
- Roediger, H.L. (1993). Learning and memory: Progress and challenge. In D.E. Meyer, & S. Kornblum (Eds.), *Attention and performance* (pp. 509-528). Cambridge, MA: MIT Press.
- Rotenberg, K.J., Eisenberg, N., Cumming, C., Smith, A., Singh, M., & Terlicher, E. (2003). The effects of adults' nonverbal cues and children's shyness on the development of rapport between adults and preschool children. *International Journal of Behavioural Development, 27*, 21-30.
- Rubin, D.C., & Kazin, M. (1984). Vivid memories. *Cognition, 16*, 81-95.
- Ruef, M., Aldrich, H.E., & Carter, N.M. (2003). The structure of founding teams: Homophily, strong ties and isolation among U.S. entrepreneurs. *American Sociological Review, 68*, 195-222.
- Saarni, C. (1999). *The development of emotional competence*. New York: Guilford Press.
- Santtila, P., Korkman, J., & Sandnabba, N.K. (2004). Effects of interview phase, repeated interviewing, presence of a support person, and anatomically detailed dolls on child sexual abuse interviews. *Psychology, Crime, and Law, 10*(1), 21-35.
- Sarason, I.G. (1980). *Test anxiety: Theory, research, and applications*. Hillsdale, NJ: Erlbaum.
- Sarason, I.G., & Sarason, B.R. (1990). Test anxiety. In H. Leitenberg (Ed.), *Handbook of social and evaluative anxiety* (pp. 475-496). New York: Plenum Press.

- Saywitz, K.J., Goodman, G.S., Nicholas, E., & Moan, S. (1991). Children's memories of physical examinations involving genital touch: Implications for reports of child sexual abuse. *Journal of Consulting Psychology, 59*, 682-691.
- Scherer, K.R. (2003). Vocal communication of emotion: A review of research paradigms. *Speech Communication, 40*(1), 227-256.
- Schmitt, K.L., & Anderson, D.R. (2002). Television and reality: Toddlers' use of visual information from video to guide behavior. *Media Psychology, 4*, 51-76.
- Schooler, J., & Loftus, E.F. (1986). Individual differences and experimentation: Complementary approaches to interrogative suggestibility. *Social Behaviour, 1*, 105-112.
- Schreiber, N., & Parker, J.F. (in press). Inviting witnesses to speculate: Effects of age and interaction on children's recall. *Journal of Experimental Child Psychology*.
- Schreiber, N., Bellah, L.D., Martinez, Y., McLaurin, K.A., Strok, R., Garven, S., & Wood, J.M. (2006). Suggestive interviewing in the McMartin Preschool and Kelly Michaels daycare abuse cases: A case study. *Social Influence, 1*, 16-47.
- Seeman, T.E., Berkman, L.F., Blazer, D., & Rowe, J.W. (1994). Social ties and support and neuroendocrine function: MacArthur studies of successful aging. *Annals of Behavioural Medicine, 16*, 95-106.
- Sekuler, R., & Blake, R. (2006). *Perception*. New York: McGraw-Hill.
- Sharot, T., Martorella, E.A., Delgado, M.R., & Phelps, E.A. (2007). How personal experience modulates the neural circuitry of memories of September 11. *Proceedings of the National Academy of Sciences, 104*(1), 389-394.
- Silverman, R.E. (1954). Anxiety and the mode of response. *Journal of Abnormal and Social Psychology, 49*, 538-542.

- Sperling, M. (1971). Spider phobias and spider fantasies. *Journal of the American Psychoanalytic Association*, 19, 472-498.
- Spielberger, C.D. (1962). The effects of manifest anxiety on the academic achievement of college students. *Mental Hygiene*, 46, 420-426.
- Spielberger, C.D. (1972). *Anxiety: Current trends in theory and research*. New York: Academic press.
- Spielberger, C.D. (1973). *Manual for the State-Trait Anxiety Inventory for Children*. Palo Alto, CA: Consulting Psychologists Press.
- Spielberger, C.D. (1993). *Inventaire d'anxiété état-trait forme Y*. Paris: Editions du Centre de Psychologie Appliquée.
- Spielberger, C.D., Edwards, C.D., Lushene, R., Montuori, J., & Platzek, D. (1973). *STAI-C preliminary manual for the State-Trait Anxiety Inventory for Children*. Palo Alto, CA: Consulting Psychologists Press.
- Spielberger, C.D., Gorsuch, R.C., & Lushene, R.E. (1970). *Manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press.
- Spielberger, C.D., Pollans, C.H., & Worden, T.J. (1984). Anxiety disorders. In S.M. Turner, & M. Hersen (Eds.), *Adult psychopathology and diagnosis* (pp. 263-303). New York: Wiley.
- Steward, M.S., & Steward, D.S. (1996). Interviewing young children about body touch and handling. *Monographs of the Society for Research in Child Development*, 61(4-5, Serial No. 248).
- Steward, M.S., O'Connor, J., Acredolo, C., & Steward, D.S. (1996). The trauma and memory of cancer treatment in children. In M.H. Bornstein, & J.L. Genevro (Eds.),

Child development and behavioral pediatrics (pp. 105–127). Mahwah, NJ: Erlbaum.

Talarico, J.M., & Rubin, D.C. (2003). Confidence, not consistency, characterizes flashbulb memories. *Psychological Science*, 14(5), 455-461.

Talmi, D., & Moscovitch, M. (2004). Can semantic relatedness explain the enhanced memory for emotional words? *Memory and Cognition*, 32(5), 742-751.

Tardy, C.H. (1992). Assessing the functions of supportive message: Experimental studies of social support. *Communication Research*, 19, 175-192.

Terr, L. (1990). *Too scared to cry: Psychic trauma in childhood*. New York: Harper and Row.

Tharp, R.G., & Wetzel, R.J. (1969). *Behavior modification in the natural environment*. New York: Academic Press.

Thierry, K.L., & Spence, M.J. (2004). A real-life event enhances the accuracy of preschoolers' recall. *Applied Cognitive Psychology*, 18, 297-309.

Thomas, S.L., Skitka, L.J., Christen, S., & Jurgena, M. (2002). Social facilitation and impression formation. *Basic and Applied Social Psychology*, 24(1), 67-70.

Thompson, W.C., Clarke-Stewart, A., & Lepore, S.J. (1997). What did the janitor do? Suggestive interviewing, accuracy and children's accounts. *Law and Human Behavior*, 21, 405-426.

Tickle-Degnen, L., & Rosenthal, R. (1990). The nature of rapport and its nonverbal correlates. *Psychological Inquiry*, 1, 285-293.

- Tobey, A.F., & Goodman, G.S. (1992). Children's eyewitness memory: Effects of participation and forensic context. *Child Abuse and Neglect*, 16, 779-796.
- Tousignant, J.P., Hall, D., & Loftus, E.F. (1986). Discrepancy detection and vulnerability to misleading postevent information. *Memory and Cognition*, 14, 329-338.
- Tulving, E., & Thomson, D.M. (1973). Encoding specificity and retrieval processes in episodic memory. *Psychological Review*, 80, 352-373.
- Turner, S., & Scherman, A. (1996). Big brothers: Impact on little brothers' self-concepts and behaviors. *Adolescence*, 31, 875-882.
- Vallerand, R.J. (1987). On the motivational effects of positive verbal reinforcement on performance: Toward an inverted-U relationship. *Motivation and Emotion*, 11(4), 367-378.
- Vertegaal, R., & Ding, Y. (2002). Explaining effects of eye gaze on mediated group conversations: Amount or synchronization? *Computer Supported Cooperative Work*, 8, 41-48.
- Vrij, A., & Bush, N. (1998). *Differences in suggestibility between 5-6 and 10-11 year olds: A matter of differences in self-confidence?* Redondo Beach, CA: Paper presented at the Meeting of the American Psychology-Law Society.
- Walker, A.G. (1999). *Handbook on questioning children: A linguistic perspective*. Washington, DC: Center for Children and the Law, American Bar Association.
- Walker-Perry, N.W., McAuliff, B.D., Tam, P., Claycomb, L., Dostal, C., & Flanagan, C. (1995). When lawyers question children: Is justice served? *Law and Human Behavior*, 19, 602-629.

- Wan, C.K., Jaccard, J., & Ramey, S.L. (1996). The relationship between social support and life satisfaction as a function of family structure. *Journal of Marriage and Family*, 58(2), 502-513.
- Warren, A.R., & Lane, P. (1995). The effects of timing and type of questioning on eyewitness accuracy and suggestibility. In M.S. Zaragoza, J.R. Graham, G.C.N. Hall, R. Hirschman, & Y.S. Ben-Porath (Eds.), *Memory and testimony in the child witness* (pp. 44-60). Thousand Oaks, CA: Sage.
- Warren, A.R., & McCloskey, L.A. (1993). Pragmatics: Language in social contexts. In J.B. Gleason (Ed.), *The Development of Language* (pp. 195-237). New York: Macmillan.
- Warren, A.R., & Swartwood, J.N. (1992). Developmental issues in flashbulb memory research: Children recall the Challenger event. In E. Winograd, & U. Neisser (Eds.), *Affect and accuracy in recall: Studies of flashbulb memories* (pp. 95-120). New York: Cambridge University Press.
- Waterman, A., Blades, M., & Spencer, C. (2004). Indicating when you do not know the answer: The effect of question format and interviewer knowledge on children's don't know responses. *British Journal of Developmental Psychology*, 22, 335-348.
- Watson, J., & Rayner, R. (1920). Conditioned emotional reactions. *Journal of Experimental Psychology*, 3, 1-22.
- Wells, A. (2005). Worry, intrusive thoughts, and generalized anxiety disorder: The metacognitive theory and treatment. In D.A. Clark (Ed.), *Intrusive thoughts in clinical disorders: Theory, research and treatment* (pp. 119-144). New York: Guilford Press.
- Wertsch, J.V. (2002). *Voices of collective remembering*. New York: Cambridge University Press.

- Williams, J.M.G., Watts, F.N., MacLeod, C., & Mathews, A. (1988). *Cognitive psychology and emotional disorders*. Chichester, UK: Wiley.
- Wiseman, S., & Tulving, E. (1976). Encoding specificity: Relation between recall superiority and recognition failure. *Journal of Experimental Psychology: Human Learning and Memory*, 2, 349-361.
- Wolchick, S.A., Sandler, I.N., & Braver, S.L. (1990). Social support: Its assessment and relation to children's adjustment. In N. Eisenberg (Ed.), *Contemporary topics in developmental psychology* (pp. 319-349). New York: Wiley.
- Wood, J.M., McClure, K.A., & Birch, R.A. (1996). Suggestions for improving interviews in child protection agencies. *Child Maltreatment*, 1, 223-230.
- Woolfolk, R.L., & Woolfolk, A.E. (1974). Effects of teacher verbal and nonverbal behaviour on student perceptions and attitudes. *American Educational Research Journal*, 11, 297-303.
- Wright, D.B., & Stroud, J.N. (1998). Memory quality and misinformation for peripheral and central objects. *Legal and Criminological Psychology*, 3, 273-286.
- Yeh, S.J., & Liu, Y.Y. (2003). Influence of social support on cognitive function in the elderly. *Health Services Research*, 3, 1-9.
- Yerkes, R.M., & Dodson, J.D. (1908). The relation of strength stimulus to rapidity of habit-information. *Journal of Comparative Neurology of Psychology*, 18, 459-482.
- Yuille, J.C., & Daylen, J.D. (1998). The impact of traumatic events on eyewitness memory. In C.P. Thompson, D.J. Herrmann, J.D. Read, D. Bruce, D.G. Payne, & M.P. Toglia (Eds.), *Eyewitness memory: Theoretical and applied perspectives* (pp. 155-178). Mahwah, NJ: Erlbaum.

Zaragoza, M.S., & Lane, S.M. (1994). Source misattributions and the suggestibility of eyewitness memory. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 20, 934–945.

Zeidner, M. (1998). *Test anxiety: The state of the art*. New York: Plenum Press.

Zeman, J., & Shipman, K. (1996). Children's expression of negative affect: Reasons and methods. *Developmental Psychology*, 32, 842-849.

Appendices

- Appendix A: Trait and State Scale of the French Translation of the STAI-C.
- Appendix B: Copy of the first page of the questionnaire booklet used in Chapters 3 and 5.
- Appendix C: Interviewer's Text with Verbal Behaviours for Chapter 5's Study Video Clips.
- Appendix D: Interviewer's Script with the Verbal Reinforcement Statements for Chapter 6's Study.
- Appendix E: Manuscript derived from the MSc dissertation (Almerigogna, J., Ost, J., Bull, R., & Akehurst, L. (2007). A state of high anxiety: How non-supportive interviewers can increase the suggestibility of child witnesses. *Applied Cognitive Psychology*, 21(7), 963-974.
- Appendix F: Manuscript derived from Chapters 3 and 4 (Almerigogna, J., Ost, J., Akehurst, L., & Fluck, M. (2008). How interviewers' nonverbal behaviors can affect children's perceptions and suggestibility. *Journal of Experimental Child Psychology*, 100(1), 17-39.
- Appendix G: Correlations between children's perception ratings for the eight clips separately for studies 1 (p. 73) and 3 (p. 100).

Appendix A

Trait and State Scale of the French Translation of the STAI-C

Lis chaque question attentivement et décide si cela t'arrive *presque jamais*, ou *parfois*, ou *souvent*. Pour chaque question, mets une croix devant le mot qui te décrit le mieux. Il n'y a ni bonne, ni mauvaise réponse. N'oublie pas, tu dois choisir le mot qui décrit le mieux comment tu te sens d'habitude.

1. Je m'inquiète de faire des erreurs	<input type="checkbox"/> presque jamais	<input type="checkbox"/> parfois	<input type="checkbox"/> souvent
2. J'ai envie de pleurer	<input type="checkbox"/> presque jamais	<input type="checkbox"/> parfois	<input type="checkbox"/> souvent
3. Je me sens triste	<input type="checkbox"/> presque jamais	<input type="checkbox"/> parfois	<input type="checkbox"/> souvent
4. J'ai du mal à me décider	<input type="checkbox"/> presque jamais	<input type="checkbox"/> parfois	<input type="checkbox"/> souvent
5. J'ai du mal à résoudre mes problèmes	<input type="checkbox"/> presque jamais	<input type="checkbox"/> parfois	<input type="checkbox"/> souvent
6. Je me fais trop de soucis	<input type="checkbox"/> presque jamais	<input type="checkbox"/> parfois	<input type="checkbox"/> souvent
7. Je m'énerve à la maison	<input type="checkbox"/> presque jamais	<input type="checkbox"/> parfois	<input type="checkbox"/> souvent
8. Je suis timide	<input type="checkbox"/> presque jamais	<input type="checkbox"/> parfois	<input type="checkbox"/> souvent
9. Je suis inquiet	<input type="checkbox"/> presque jamais	<input type="checkbox"/> parfois	<input type="checkbox"/> souvent
10. Je pense à des choses sans importance et ça m'embête	<input type="checkbox"/> presque jamais	<input type="checkbox"/> parfois	<input type="checkbox"/> souvent
11. Je m'inquiète pour mes notes à l'école	<input type="checkbox"/> presque jamais	<input type="checkbox"/> parfois	<input type="checkbox"/> souvent
12. J'ai du mal à choisir quoi faire	<input type="checkbox"/> presque jamais	<input type="checkbox"/> parfois	<input type="checkbox"/> souvent
13. Je remarque que mon cœur bat très vite	<input type="checkbox"/> presque jamais	<input type="checkbox"/> parfois	<input type="checkbox"/> souvent
14. En fait, à l'intérieur, j'ai très peur	<input type="checkbox"/> presque jamais	<input type="checkbox"/> parfois	<input type="checkbox"/> souvent
15. Je m'inquiète pour mes parents	<input type="checkbox"/> presque jamais	<input type="checkbox"/> parfois	<input type="checkbox"/> souvent
16. Mes mains deviennent moites	<input type="checkbox"/> presque jamais	<input type="checkbox"/> parfois	<input type="checkbox"/> souvent
17. Je m'inquiète de se qu'il pourrait arriver	<input type="checkbox"/> presque jamais	<input type="checkbox"/> parfois	<input type="checkbox"/> souvent
18. J'ai du mal à m'endormir la nuit	<input type="checkbox"/> presque jamais	<input type="checkbox"/> parfois	<input type="checkbox"/> souvent
19. J'ai des papillons dans l'estomac	<input type="checkbox"/> presque jamais	<input type="checkbox"/> parfois	<input type="checkbox"/> souvent
20. Je m'inquiète de ce que les autres pensent de moi	<input type="checkbox"/> presque jamais	<input type="checkbox"/> parfois	<input type="checkbox"/> souvent

Lis attentivement chaque question et réfléchis à comment tu te sens *maintenant*. Puis, fais une croix dans la case devant le mot qui décrit le mieux comment tu te sens. Il n'y a ni bonne ni mauvaise réponse. N'oublie pas, tu dois cocher la case qui décrit le mieux comment tu te sens maintenant, à *ce moment précis*.

1. Je me sens	<input type="checkbox"/> très calme	<input type="checkbox"/> calme	<input type="checkbox"/> pas calme
2. Je me sens	<input type="checkbox"/> très préoccupé(e)	<input type="checkbox"/> préoccupé(e)	<input type="checkbox"/> pas préoccupé(e)
3. Je me sens	<input type="checkbox"/> très agréable	<input type="checkbox"/> agréable	<input type="checkbox"/> pas agréable
4. Je me sens	<input type="checkbox"/> très nerveux(se)	<input type="checkbox"/> nerveux(se)	<input type="checkbox"/> pas nerveux(se)
5. Je me sens	<input type="checkbox"/> très stressé(e)	<input type="checkbox"/> stressé(e)	<input type="checkbox"/> pas stressé(e)
6. Je me sens	<input type="checkbox"/> très reposé(e)	<input type="checkbox"/> reposé(e)	<input type="checkbox"/> pas reposé(e)
7. Je me sens	<input type="checkbox"/> très effrayé(e)	<input type="checkbox"/> effrayé(e)	<input type="checkbox"/> pas effrayé(e)
8. Je me sens	<input type="checkbox"/> très relax(e)	<input type="checkbox"/> relax(e)	<input type="checkbox"/> pas relax(e)
9. Je me sens	<input type="checkbox"/> très soucieux(se)	<input type="checkbox"/> soucieux(se)	<input type="checkbox"/> pas soucieux(se)
10. Je me sens	<input type="checkbox"/> très satisfait(e)	<input type="checkbox"/> satisfait(e)	<input type="checkbox"/> pas satisfait(e)
11. Je me sens	<input type="checkbox"/> très apeuré(e)	<input type="checkbox"/> apeuré(e)	<input type="checkbox"/> pas apeuré(e)
12. Je me sens	<input type="checkbox"/> très heureux(se)	<input type="checkbox"/> heureux(se)	<input type="checkbox"/> pas heureux(se)
13. Je me sens	<input type="checkbox"/> très sûr(e) de moi	<input type="checkbox"/> sûr(e) de moi	<input type="checkbox"/> pas sûr(e) de moi
14. Je me sens	<input type="checkbox"/> très bien	<input type="checkbox"/> bien	<input type="checkbox"/> pas bien
15. Je me sens	<input type="checkbox"/> très troublé(e)	<input type="checkbox"/> troublé(e)	<input type="checkbox"/> pas troublé(e)
16. Je me sens	<input type="checkbox"/> très ennuyé(e)	<input type="checkbox"/> ennuyé(e)	<input type="checkbox"/> pas ennuyé(e)
17. Je me sens	<input type="checkbox"/> très content(e)	<input type="checkbox"/> content(e)	<input type="checkbox"/> pas content(e)
18. Je me sens	<input type="checkbox"/> très terrifié(e)	<input type="checkbox"/> terrifié(e)	<input type="checkbox"/> pas terrifié(e)
19. Je me sens	<input type="checkbox"/> très perturbé(e)	<input type="checkbox"/> perturbé(e)	<input type="checkbox"/> pas perturbé(e)
20. Je me sens	<input type="checkbox"/> très joyeux(se)	<input type="checkbox"/> joyeux(se)	<input type="checkbox"/> pas joyeux(se)

Appendix B

Copy of the first page of the questionnaire booklet used in Chapters 3 and 5

You will watch 8 short videos. After each video you will have to answer 6 questions. For each question put a cross in the box which best represent what you felt about the person in the video.

① Did you find the interviewer

- ☐ Very friendly ☐ Friendly ☐ Neither friendly nor not friendly ☐ Not friendly ☐ Not friendly at all

② Did you find the interviewer

- ☐ Very strict ☐ Strict ☐ Neither strict nor not strict ☐ Not strict ☐ Not strict at all

③ Did you find the interviewer

- ☐ Very helpful ☐ Helpful ☐ Neither helpful nor not helpful ☐ Not helpful ☐ Not helpful at all

④ Did you find the interviewer

- ☐ Very sincere ☐ Sincere ☐ Neither sincere nor not sincere ☐ Not sincere ☐ Not sincere at all

⑤ Did you find the interviewer

- ☐ Very bored ☐ Bored ☐ Neither bored nor not bored ☐ Not bored ☐ Not bored at all

⑥ Did you find the interviewer

- ☐ Very stressed ☐ Stressed ☐ Neither stressed nor not stressed ☐ Not stressed ☐ Not stressed at all

Appendix C

Interviewer's Text with Verbal Behaviours for Chapter 5's Study Video Clips

Below is the dialogue between an interviewer and an unseen young interviewee as depicted in the video clips. The different verbal behaviours are in italics.

Interviewer (I): Can you tell me what you did last Wednesday? (Neutral/positive statement:) *Just tell me anything you remember, even if you think it's silly or not important.* (Verbal coercion:) *Just tell me what happened, and if you do a good job I'll give you some sweets at the end.*

Young interviewee (Y): We went to the museum.

I: (Positive verbal filler:) *Uh-huh.* (Negative verbal filler:) *Oh!* What did you see at the museum?

Y: An exhibition about the senses.

I: (Positive verbal filler:) *Yes.* (Negative verbal filler:) *Um... Okay!* (Positive verbal reinforcement:) *You're doing great.* (Negative verbal reinforcement:) *You can do better.* Tell me more about that exhibition.

Y: ...

I: What did you see at the exhibition? (Neutral/positive statement:) *Remember that I wasn't there, I don't know what happened so the more you tell me, the more I'll know.* (Verbal coercion:) *I've already seen your friends and they've all mentioned to me what they saw in the exhibition so just tell me everything.*

Y: I saw a big horse.

I: (Positive verbal filler:) *Uh-huh.* (Negative verbal filler:) *Oh.* (Positive verbal reinforcement:) *That's right.* (Negative verbal reinforcement:) *That's not right.*
Where was the horse?

Y: ... Don't remember.

I: (Positive verbal reinforcement:) *You're being a great help.* (Negative verbal reinforcement:) *You're not helping us at all here.* Can you tell me more about the horse?

Y: You could touch it. To feel its fur.

I: (Neutral/positive statement:) *Really? I bet that felt nice.* (Verbal coercion:) *Are you sure? None of the other children mentioned such a horse.*

Appendix D

Interviewer's Script with the Verbal Reinforcement Statements for Chapter 6's Study

Below is the interviewer's script for Chapter 6's study. The verbal reinforcement statements are specified (in italics) at seven points throughout the interview questions. Participants in the supportive condition heard the positive verbal reinforcements and children interviewed by the non-supportive interviewer heard the negative verbal reinforcements.

Interviewer: I would like to know what happened last week when you participated in that learning activity. Do you remember? Well, I'm just going to ask you a few questions, is that ok?

- 1 What did the lady talk to you about?
(Positive verbal reinforcement:) *I believe that's correct*
(Negative verbal reinforcement:) *I believe that's wrong*
- 2 How long did she say the activity would last for? Five minutes?
- 3 What colour was her skirt?
- 4 How many vocal chords did she say people have? Three? Four?
(Positive verbal reinforcement:) *That's wonderful*
(Negative verbal reinforcement:) *That's awful*
- 5 Can you show me where on your face are your vocal chords?
- 6 She talked about sick vocal chords too. How big can sick vocal chords become?
(Positive verbal reinforcement:) *You're doing great*
(Negative verbal reinforcement:) *You can do better*
- 7 How can your vocal chords be sick?
- 8 Someone knocked at the door and interrupted at one point. Who was it?

(Positive verbal reinforcement:) *Take your time*

(Negative verbal reinforcement:) *Come on, hurry up*

9 That bump some people have in their throat, it has the name of a vegetable. What is it called?

10 She took something out of her pocket. What was it?

11 She showed you some vocal chords. How? Did she show you photographs?

(Positive verbal reinforcement:) *You've got a great memory*

(Negative verbal reinforcement:) *Your memory isn't very good*

12 The chalk she had in her hand, did she throw it away?

13 You made sounds to feel vibrations, what sound did you make?

(Positive verbal reinforcement:) *That's clever*

(Negative verbal reinforcement:) *That's silly*

14 What word did she ask you to say?

15 Where on your body did you have to feel the vibrations?

16 Did you also have to put your hands on your ears?

(Positive verbal reinforcement:) *You're being a great help*

(Negative verbal reinforcement:) *You're not helping much*

17 Where on your body did the lady touch you to feel the vibrations?

18 At the end, did Ms. ____, your teacher, say that she really enjoyed participating in the activity with you?

Appendix E

Manuscript derived from the MSc dissertation (Almerigogna, J., Ost, J., Bull, R., & Akehurst, L. (2007). A state of high anxiety: How non-supportive interviewers can increase the suggestibility of child witnesses. *Applied Cognitive Psychology*, 21(7), 963-974.

A State of High Anxiety: How Non-Supportive Interviewers can Increase the Suggestibility of Child Witnesses

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SUMMARY

The present study examined the effects of state and trait anxiety on 8–11 years old children's susceptibility to misleading post-event information. Participants' state and trait anxiety were measured, after which they watched an extract from a children's movie. They were then individually interviewed using either a supportive or a non-supportive style. During the interviews, the children were asked 14 questions about the movie, seven of which were control and seven contained misleading information. After the interview, their state anxiety was measured again. Results showed that participants interviewed in a non-supportive style were more likely to provide incorrect answers to misleading questions. Furthermore, participants who scored highly on both trait and post-interview state anxiety measures more often responded incorrectly to misleading questions. Also, pre-to post-interview changes in state anxiety were correlated with more incorrect responses to misleading questions.

Typically, researchers looking at the suggestibility of child witnesses have focused their attention on cognitive factors (Ceci & Bruck, 1993) and on the effects of certain questioning styles (Fivush, Peterson, & SchwarzmueLLer, 2002). However, studies have now started to examine the influence of social and individual factors on the testimony of these witnesses (e.g., Davis & Bottoms, 2002a; Ridley, Clifford, & Keogh, 2002). The present study investigated two such factors: interviewer manner

(a social factor) and anxiety (an individual factor). To examine these two factors, it focused on three questions. First, can the behaviour of interviewers affect the quality of the information given by the children they are interviewing? Second, does the level of anxiety experienced by children affect their accuracy or suggestibility? And finally, is there an interaction between the interviewer manner and the child's level of anxiety?

WHAT FACTORS CAN AFFECT THE QUALITY OF INFORMATION PROVIDED BY CHILD WITNESSES?

As Ceci and Bruck (1993) noted, cognitive capacities are only one of a number of possible factors that can affect the quality of information children provide in forensic interviews. Other social and situational factors are likely to be equally important. The manner or behaviour of the interviewer is one such factor. During an interview, an interviewer can adopt a generally supportive or non-supportive behaviour. For example, a supportive interviewer might be smiling, making eye contact, sitting with an open body posture and building rapport with the interviewee, whereas a non-supportive interviewer might be cold and distant, avoiding smiles and eye contact. Bull (1998) argued that an interviewer who adopts a negative behavioural manner creates an interpersonal environment in which a child witness may not feel comfortable or at ease. Such non-supportive environments may not really help in obtaining full and accurate reports from child witnesses (Wood, McClure, & Birch, 1996).

One common way of reducing these negative effects would be for the interviewer to behave in a supportive manner (Moston, 1989). Yet, the effect of interviewers' social support on child witnesses is a sensitive subject in eyewitness research because it has generally been thought that supporting children during interviews could actually increase their suggestibility by augmenting their desire to comply with and be agreeable to the interviewer (Moston & Engelberg, 1992). However, several studies have now demonstrated that quite the opposite may be likely to happen (Bottoms, Quas, & Davis, in press). For example, Carter, Bottoms, and Levine (1996) found that a supportive interviewer actually reduced the suggestibility of child witnesses. In their study, 5–7 year old children were interviewed in either a supportive manner (i.e., the interviewer was friendly, smiled and gazed often at

participants, sat in a relaxed manner and attempted to build rapport) or in an intimidating manner (i.e., the interviewer was cold and distant, did not smile or gaze much and did not attempt to build rapport with the children). Their results showed that whilst interviewer manner had no effect on the children's free recall, it did have an effect on their level of suggestibility. Those children who were interviewed in the supportive manner demonstrated an increased resistance to misleading questions compared to those interviewed in the intimidating manner. Carter *et al.* (1996) hypothesised that the positive effect on suggestibility of an interviewer who behaved in a supportive manner could be due to this style of interviewing making children less anxious. Davis and Bottoms (2002a) conducted an experiment to test this assumption directly. They showed that social support in the form of positive reinforcement and behaviours displayed by the interviewer during an interview might, as previously demonstrated, increase children's resistance to misleading suggestions. Positive reinforcements were defined by the interviewer building rapport, smiling and gazing often, speaking with a warm tone of voice and sitting closely and in a relaxed manner. Their results also indicated that the interviewer-provided social support served to reduce children's level of anxiety. That is, children interviewed by the supportive interviewer felt less anxious during the interview than children interviewed by the intimidating interviewer. Although Davis and Bottoms did not find any effect of anxiety on children's suggestibility, they suggested that anxiety might be a mediating factor between interviewers' behaviours and suggestibility.

WHAT ARE THE EFFECTS OF ANXIETY ON THE ACCURACY AND SUGGESTIBILITY OF CHILD WITNESSES?

Goodman, Rudy, Bottoms, and Aman (1990) observed that child witnesses often give only short accounts of the events they have witnessed. Part of the reason why this happens, they noted, might be the anxiety-inducing nature of interviews. That is, interviews may be experienced by children as anxiety-inducing situations (Moston & Engelberg, 1992). In the present study, we were therefore interested in the effect of both trait and state anxiety at the retrieval phase, that is, during the interview. Trait anxiety is a stable and enduring personality dimension, which is said to remain constant across different situations. State anxiety, on the other hand, is the anxiety a

person experiences in a certain situation (Spielberger, 1972). It is therefore directly linked to the specific characteristics of a situation (Rachman, 2004). In the present study, it was predicted that the two distinct interviewing styles should differently affect children's state anxiety.

Research has shown that the performance of anxious people is usually inferior to that of non-anxious individuals on a variety of cognitive tasks (Eysenck, 1992). Eysenck (1997) proposed that at event-recall, high trait anxious individuals are more likely to be concerned about failure and self-presentation than low trait anxious ones. This could increase their suggestibility by using cognitive resources which would otherwise be applied to retrieval strategies and memory monitoring (Williams, Watts, MacLeod, & Mathews, 1988). For state anxiety, Farber and Spence (1953) argued that high levels of state anxiety at retrieval reduce performance on complex tasks while having facilitating effects on more simple exercises. High-state anxious persons are more likely to misinterpret a question or to feel unable to access an answer they are confident they know (Sarason, 1980). Accordingly, highly anxious individuals should perform more poorly in suggestibility studies than low anxious participants (Wolfradt & Meyer, 1998). Gudjonsson (1988) found support for this hypothesis in a study with adults in which he demonstrated that high levels of both state and trait anxiety, as measured by the Spielberger State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1970), were related to high scores on his scale of interrogative suggestibility (the Gudjonsson Suggestibility Scale: Gudjonsson, 1984). However, Ridley and Clifford (2004) found that adult participants scoring higher on a state anxiety measure were actually less likely to answer incorrectly to misleading questions. Yet, by only measuring state anxiety, Ridley and Clifford may have missed the possible interaction of pre-existing trait anxiety with state anxiety. They also might have overlooked the possibility that anxiety acts as a mediator between suggestibility and other factors (e.g., interviewer manner).

HOW COULD THE INTERACTION BETWEEN THE INTERVIEWERS' BEHAVIOUR AND CHILD WITNESSES' ANXIETY AFFECT THEIR SUGGESTIBILITY?

The present study attempted to extend Carter *et al.*'s (1996) study by manipulating interviewer manner and measuring both state and trait anxiety. The present study's

aim was to examine the interacting effects of interviewing manner and anxiety on the suggestibility and memory accuracy of child witnesses. Participants first watched a short film after which their trait and state anxiety were measured. They were then individually interviewed in either a supportive or a non-supportive manner and asked seven control and seven misleading questions. After the interview, each child completed a second state anxiety questionnaire. In line with previous research (e.g., Carter *et al.*, 1996; Davis & Bottoms, 2002a), it was predicted that a non-supportive interviewer would lead children to answer more of the misleading questions incorrectly. Furthermore, it was predicted that children with higher state and trait anxiety scores would exhibit a higher tendency to answer misleading questions incorrectly compared to children with lower anxiety scores. Finally, it was predicted that the state anxiety of participants would differ depending on which interviewing style they experienced. Children interviewed in a supportive manner should show a decrease in state anxiety whereas those interviewed in a non-supportive manner should demonstrate an increase in state anxiety. Furthermore, whether these changes in levels of pre- to post-interview state anxiety were related to participants' suggestibility scores was also examined.

METHOD

Participants

Seventy-four children participated in the experiment. Following cleaning and screening, data from five children were removed due to large numbers of missing values which, because of the nature of analysis, could not be replaced with a measure of central tendency such as a median or a mean. Of the remaining 69 children, there were 35 girls and 34 boys. The mean age for this sample was 9.27 years (range = between 8 years and 11.5 years, SD = 0.72 years). The participants were all pupils from a primary school. Four classes took part in the experiment, 2 year three classes (ages 8–10 years) and 2 year four classes (ages 9–11 years). One class from each year was assigned to either the supportive or the non-supportive interview style conditions. Children's age did not differ as a function of whether they were interviewed by a supportive or non-supportive interviewer ($p > 0.05$).

Materials

Anxiety questionnaire

The questionnaire used to measure trait and state anxiety was Spielberger, Edwards, Lushene, Montuori, and Platzek's (1973) State-Trait Anxiety Inventory for Children (STAI-C). It comprised 40 questions printed on two sheets. The first part of the questionnaire consisted of 20 questions designed to measure children's trait anxiety. It included statements such as 'I am shy', 'I notice my heart beats fast' and 'I worry about what others think of me'. These questions were answered by indicating 'hardly-ever', 'sometimes' or 'often'. The other 20 questions measured their state anxiety with statements like 'I feel very calm, calm or not calm', 'I feel very nervous, nervous or not nervous' and 'I feel very terrified, terrified or not terrified'. The instructions were written on top of the questionnaire. The same questionnaire was distributed to all participants.

Movie

The clip shown to the participants was an extract from the U-rated movie 'Madeline'. It was 5 minutes and 17 seconds long. All pupils saw the same clip. An outline of the event is appended.

Interviewer manner manipulation

In line with previous research (e.g., Carter *et al.*, 1996; Davis & Bottoms, 2002a), the two interviewing styles (supportive and non-supportive) were distinguished by the interviewer's use of different verbal and non-verbal behaviours. In the non-supportive interviews, the interviewer adopted a formal and stern attitude. She was sitting with her legs crossed and arms folded, leaning back in her chair. Her behaviour was serious and she did not smile. She made very little attempt to build rapport with her interviewees. She was wearing black formal clothes and spectacles. For the supportive interviews, the same interviewer appeared a lot more relaxed. She adopted an open body posture. She tried to build rapport with the children, looked at them more and acted in a friendlier manner. She was wearing coloured casual clothes and did not wear spectacles.

Structure of the interview and interview questions

For the purpose of the study, 14 questions were designed based on the movie clip. In order to control for item-specific confounds in the ease with which participants might

be misled about certain aspects of the movie, each question was designed to have both a control and a misleading form. For example, a question asking children what was on the kitchen table would in its control form be 'Was there anything on the table'? and in its misleading form 'Were there eggs on the table'? Children were presented with either the control form of a question or the misleading form of it. No child was presented with the same question in different forms (i.e., control and misleading). Each question was presented in its control and misleading version the same number of times.

Each child was asked 14 questions, seven control and seven misleading. The questions were presented to the children orally by the interviewer. Questions were asked once and followed the sequence of the movie. The answers to the seven control questions were used to measure children's memory accuracy (thus giving a 'memory accuracy' score of 0–7). Their responses to the seven misleading questions measured their level of susceptibility to misinformation (thus giving a 'suggestibility' score of 0–7).

Procedure

For the first part of the experiment, the children were tested in groups. First, the STAI-C was distributed to them. The instructions, which were written at the top of the sheets, were read aloud by the investigator. They were also told that they were free to ask questions at any time if there was something they did not comprehend in the questionnaire. There was no time limit for the completion of the STAI-C although none of the participants took more than 15 minutes to finish it. The children then watched the movie in groups of 14 to 23 after which they were individually interviewed. After each interview, participants were presented with a second state anxiety questionnaire which comprised the same 20 questions which formed the state anxiety part of the STAI-C. The children were then thanked and returned to their usual class activities. Interviews lasted between 7 and 15 minutes. Once all pupils had participated, the experimenter debriefed them in groups as to the aims of the study and answered any questions they had.

RESULTS

Effects of interviewing style on memory accuracy and suggestibility scores

A MANOVA was performed with interviewing style (supportive or non-supportive) as the independent variable, and the memory accuracy and suggestibility measures as dependent variables. To verify whether the results could have been influenced by either the age or the gender of participants, these two variables were entered as covariates. There was an effect of interviewer manner for suggestibility scores (i.e., incorrect responses to misleading questions) ($F_{1, 65} = 27.21, p < 0.001$, partial $\eta^2 = 0.29$). The mean scores indicated that participants interviewed in a non-supportive manner gave significantly more incorrect responses to misleading questions ($M = 2.03, SD = 1.05$) than those being interviewed in a supportive manner ($M = 0.86, SD = 1.06$). There was no effect of interviewing style on accuracy scores ($p > 0.05$) and there was no effect of age or gender on either the accuracy or suggestibility scores (both $p > 0.05$).

Effects of state and trait anxiety on memory accuracy and suggestibility scores

In order to investigate the effect of state and trait anxiety on children’s memory accuracy and suggestibility, median-splits were performed on participants’ trait anxiety scores and post-interview state anxiety scores. For trait anxiety, the median score was 36 and for post-state anxiety the median score was 29. Participants with scores under the median were categorised as low-state or low-trait anxious whereas scores above the median were categorised as high-state or high-trait anxious. This resulted in a combined anxiety variable with four levels (i.e., high-trait/high-state, high-trait/low-state, low-trait/high-state, low-trait/low-state). Table 1 shows the means and standard deviations of the memory accuracy and suggestibility scores for each of these groups.

Table 1. Means and standard deviations for the number of correct answers on control questions and the number of incorrect answers on misleading questions for the four levels of anxiety groups.

	Correct control		Incorrect misleading	
	Mean	SD	Mean	SD
High-trait/high-state (N=21)	4.33	1.28	1.95	1.16
High-trait/low-state (N=14)	4.86	1.17	1.5	1.02
Low-trait/high-state (N=11)	3.91	1.45	1.36	.81
Low-trait/low-state (N=23)	4.35	1.3	.91	.9

A MANOVA was performed with the four levels of anxiety as the independent variable, and accuracy and suggestibility scores as the dependent variables. There was a main effect of anxiety on the suggestibility scores ($F_{3, 65} = 4.19, p < 0.01$, partial $\eta^2 = 0.02$). Post hoc Tukey tests revealed that only the difference between the low-trait/low-state and the high-trait/high-state anxiety groups for the suggestibility scores was significant ($p < 0.005$). The means revealed that participants with high scores on both the state and trait anxiety measures gave more incorrect responses to misleading questions ($M = 1.95$) than children with low state and trait anxiety scores ($M = 0.91$). It should be noted that the same combination of high-trait and high post-interview state anxiety did not have a significant effect on the number of correct responses to control questions.

Relationship between interviewing styles and anxiety

In order to observe the possible effects of the supportive and non-supportive styles of interviewing on the level of state anxiety of participants, the difference between pre- and post-state anxiety for the two interviewing style groups was examined with an independent t-test. A significant difference between the two groups in terms of pre-interview state anxiety was observed ($t_{67} = 4.04, d = 1.00, p < 0.001$; supportive $M = 33.22$, non-supportive $M = 27.88$). As the groups were similar in terms of age and gender, the reason for this pre-interview state anxiety difference is unclear. T-tests were also performed to compare the means of the pre- and post-interview state anxiety scores, which found that the changes between the pre-interview state anxiety and post-interview state anxiety were significant for both the supportive group ($t_{35} = 5.66, d = 0.98, p < 0.001$; pre-interview state anxiety $M = 33.22$, post-interview state anxiety $M = 28$) and the non-supportive group ($t_{32} = 3.84, d = 0.74, p = 0.001$; pre-interview state anxiety $M = 27.88$, post-interview state anxiety $M = 31.88$). These results suggest that the two different interviewing styles did have an effect on the state anxiety of participants, with the supportive manner decreasing it and the non-supportive one increasing it. No significant difference in terms of trait anxiety scores was observed between the supportive group ($M = 36.72$) and the non-supportive one ($M = 36.48$).

Relationship between state anxiety variations and memory and suggestibility

To further investigate the possible relationship between anxiety and suggestibility, a new variable was calculated from participants' pre- and post-interview state anxiety measures. The post-interview state anxiety scores were subtracted from the pre-interview state anxiety scores so as to give a pre- to post-interview change in the state anxiety scores of each participant. A positive score on this variable therefore showed that the participant became less anxious during the interview (e.g., a pre-state anxiety score of 30 minus a post-state anxiety score of 25 equals a difference of +5) whereas a negative score indicated a rise in state anxiety (e.g., a pre-state anxiety score of 30 minus a post-state anxiety score of 35 equals a difference of -5). Correlations between this new 'change' variable and the performance on control and misleading questions demonstrated that there was no relationship between the state anxiety 'change' variable and number of correct answers to control questions ($r = 0.16$, $p = 0.18$) but there was a significant negative relationship between the 'change' scores and the number of incorrect answers to misleading questions ($r = -0.46$, $p < 0.001$). That is, participants who reported feeling less anxious after the interview than before gave less incorrect answers to the misleading questions and those who were more anxious after the interview than before it provided a greater number of incorrect responses to misleading questions (only two of those children feeling more anxious post- than pre-interview had been interviewed by the supportive interviewer. However, their pre- to post-state anxiety differences were very low (-2 and -3, respectively) and both children made no incorrect answers to the misleading questions).

Trait anxiety, memory and suggestibility

The correlation between trait anxiety and the number of correct responses to control questions was significant ($r = 0.26$, $p < 0.05$). That is, children with higher trait anxiety scores were more likely to give correct answers to control questions than children with lower trait anxiety levels. The correlation between trait anxiety and the number of incorrect responses to misleading questions was also significant ($r = 0.34$, $p < 0.005$). Children with higher trait anxiety scores were more likely to answer misleading questions incorrectly than children with lower trait anxiety scores.

DISCUSSION

The aim of the present study was to examine the possible effects of interviewing style and levels of state and trait anxiety on children's eyewitness testimony. The results showed that the two different interviewing styles (supportive and non-supportive) had a significant effect on children's suggestibility, with children in the non-supportive group answering significantly more of the misleading questions incorrectly than children in the supportive condition. Furthermore, participants scoring highly on measures of both state and trait anxiety were more prone to give incorrect responses to misleading questions than participants having low scores on these measures. Moreover, the two different interviewing methods appeared to create environments that were, as measured by their post-interview state anxiety scores, experienced differently by children.

Interviewing styles and suggestibility

The present study demonstrated that an interviewer adopting a non-supportive demeanour could increase children's suggestibility. This is in accordance with Gudjonsson's (1992) argument that interviewer authority would lead children to comply more with whatever an interviewer says thus augmenting their suggestibility. In a similar vein, Goodman, Bottoms, Schwartz-Kenney, and Rudy (1991) noted that an interviewer providing social support, such as smiles and verbal encouragements, to child interviewees significantly lessened incorrect free recall and subsequent errors in response to misleading questions. Engelberg and Christianson (2002) contended that interviewees have to be provided with an environment of safety and support in order to make them feel more comfortable and secure, and to this we can add 'less anxious'. In this way, adult and child interviewees alike may be more able to talk about their memories in a more articulate and complete manner. However, too much support may also decrease performance as interviewers may become too persistent and coercive (Garven, Wood, Malpass, & Shaw, 1998) and, as Bain, Baxter, and Fellowes (2004) have highlighted, a balance between support and focus on the matter under discussion may be needed. Therefore, for improved forensic practice, variables which could possibly influence interviewees and their account of the witnessed event need to be better identified and understood. As demonstrated by the present study, the behaviour of the interviewer plays a key role (Carter *et al.*, 1996). However, more research is needed to further investigate these issues. For example, are there specific aspects of an interviewer's non-verbal or verbal

behaviour that have more, or less, of an effect on the accuracy of what child witnesses recall and report?

Anxiety and suggestibility

Clark and Wells (1995) argued that an anxious person's performance can be diminished by anxiety because of processes such as intrusive thoughts and worry. They stated that anxious people are so preoccupied with their internal sensations and their meanings that they become relatively inattentive to whatever is going on around them. These anxious individuals, their mind full of interfering negative thoughts about themselves and their capacities, with both their self-confidence and their efficacy undermined, would be expected to perform poorly on a cognitively demanding task such as answering questions (Wells, 2005). The findings of the present study are also in line with the processing efficiency theory (Eysenck & Calvo, 1992), suggesting that highly anxious children might have had fewer cognitive resources available to allocate to the more difficult aspects of the task at hand (i.e., dealing with misleading questions).

The present study found that anxiety was related to suggestibility, but not to accuracy scores. This too, may be best explained in terms of differences in levels of cognitive resources required to answer misleading and non-misleading questions. According to the discrepancy detection principle (Tousignant, Hall, & Loftus, 1986), memories are less likely to be transformed when one directly detects discrepancies between the original memory and the misinformation (Schooler & Loftus, 1986). Undetected discrepancies may lead to source misattributions errors, that is, recalling items that were only suggested (Zaragoza & Lane, 1994). Retrieving answers to non-misleading questions should therefore be, cognitively speaking, a less demanding task than undertaking a memory search to compare misleading information provided by an interviewer with what was initially witnessed. The difference in difficulty and hence cognitive resources required, may explain the finding that anxiety was only related to participants' suggestibility scores and not their memory accuracy scores.

Interviewing styles and anxiety

The present study found an effect of interviewing style on state anxiety with supportive interviewer behaviours decreasing children's level of state anxiety and non-supportive manners increasing it. Because state anxiety is sensitive to changes

in the immediate context (Spielberger, 1972), it was influenced by interviewer behaviours. The more pleasant environment created in the supportive condition may have put children more at ease and, as a consequence, made them feel less nervous. On the contrary, in the non-supportive interviews, participants, feeling more vulnerable and oppressed, became more anxious. This is in line with Carter *et al.*'s (1996) hypothesis which stated that children should be less anxious when an interviewer behaves in a supportive, as opposed to a non-supportive, manner. This finding is important for applied procedures. It is recognised that forensic interviews are unpleasant experiences for children. Simply by adopting certain behaviours, the interviewer can affect the interviewees' feelings of the situation (Davis & Bottoms, 2002b). That is, by being more supportive, the interviewer can make children feel more comfortable and less anxious. In this more positive environment, they are likely to report more information of better quality (Goodman *et al.*, 1990) and, as the present study demonstrated, to be better able to resist misleading information.

Limitations of the present study

The present study measured anxiety with the STAI-C and, although this test has good validity and reliability (Spielberger *et al.*, 1970), its construct has been questioned. Kelly (2004) argued that the trait scale of the STAI comprised a 'worry' component which should actually be considered separately from trait anxiety (Davey, Hampton, Farrell, & Davidson, 1992). To overcome such problems, previous studies have sometimes measured arousal using participants' physiological responses like heart rate, blood pressure or palm sweating. For example, Quas and Lench (2007) measured children's heart rate while encoding and retrieving information from a fear eliciting video clip. Children with higher heart rate at encoding answered fewer questions incorrectly while those with higher heart rate at retrieval answered more questions incorrectly but only when interviewed by a non-supportive interviewer. Such measures may be more appropriate and accurate to investigate the relationship between witnesses' arousal and suggestibility. The to-be-remembered event used in the present study was a movie clip. As has been argued, movie clips, although rich in information and easily controllable, are not very ecologically valid (Saywitz, Goodman, Nicholas, & Moan, 1991). They are also rather impersonal and insignificant for the participating children. With such events, children are passive observers and they may therefore feel little concern to put all of their attention in the

task (Thierry & Spence, 2004). Several studies (e.g., Krackow & Lynn, 2003; Nathanson & Saywitz, 2003) have demonstrated that it is quite possible to involve children in a meaningful activity while remaining ethical. For example, Gilstrap and Papierno (2004) staged an event with a magician visiting the children at school. The children watched and participated in magic tricks, sang and danced. In Krackow and Lynn's study, children were involved in a game of Twister. Such events are both salient and exciting for children. For a better application of laboratory studies and to better mimic the actions of children's memory about a real-life event, it would be better not to use movie clips as the to-be-remembered event.

CONCLUSION

Situational factors influencing people's memory and suggestibility in forensic interviews have seldom been studied. However, the present study demonstrated that such factors can have a great influence on child interviewees. It was shown that both the behaviour the interviewer adopts while trying to gather information and children's level of anxiety during an interview do affect the quality of the children's answers. Factors such as interviewing manner can be controlled and manipulated in interviews more easily than can individual or cognitive factors (Roberts, Lamb, & Sternberg, 2004). Future research should therefore focus on these dynamic situational aspects of interviews in order to develop more appropriate procedures for interviewing child witnesses.

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REFERENCES

Bain, S.A., Baxter, J.S., & Fellowes, V. (2004). Interacting influences on interrogative suggestibility. *Legal and Criminological Psychology*, 9, 239–252.

- Bottoms, B.L., Quas, J.A., & Davis, S.L. (in press). The influence of interviewer-provided social support on children's suggestibility, memory, and disclosures. In M.E. Pipe, M. Lamb, Y. Orbach, & A.C. Cedarborg (Eds.), *Child sexual abuse: Disclosure, delay and denial*. Mahwah, NJ: Erlbaum.
- Bull, R. (1998). Obtaining information from child witnesses. In A. Memon, A. Vrij, & R. Bull (Eds.), *Psychology and law: Truthfulness, accuracy, and credibility* (pp. 188–209). Maidenhead: McGraw-Hill.
- Carter, C.A., Bottoms, B.L., & Levine, M. (1996). Linguistic and socioemotional influences on the accuracy of children's reports. *Law and Human Behavior*, 20, 335–358.
- Ceci, S.J., & Bruck, M. (1993). Suggestibility of the child witness: A historical review and synthesis. *Psychological Bulletin*, 113, 403–439.
- Clark, D.M., & Wells, A. (1995). A cognitive model of social phobia. In R.G. Heimberg, M.R. Liebowitz, D.A. Hope, & F.R. Schneier (Eds.), *Social phobia: Diagnosis, assessment and treatment* (pp. 69–93). New York: Guilford Press.
- Davey, C.L., Hampton, J., Farrell, J., & Davidson, S. (1992). Some characteristics of worrying: Evidence for worrying and anxiety as separate constructs. *Personality and Individual Differences*, 13, 133–147.
- Davis, S.L., & Bottoms, B.L. (2002a). Effects of social support on children's eyewitness reports: A test of the underlying mechanism. *Law and Human Behavior*, 26, 185–215.
- Davis, S.L., & Bottoms, B.L. (2002b). Social support and children's eyewitness testimony. In M.L. Eisen, J.A. Quas, & G.S. Goodman (Eds.), *Memory and suggestibility in the forensic interview* (pp. 437–457). Mahwah, NJ: Erlbaum.
- Engelberg, E., & Christianson, S.-A. (2002). Stress, trauma, and memory. In M.L. Eisen, J.A. Quas, & G.S. Goodman (Eds.), *Memory and suggestibility in the forensic interview* (pp. 143–163). Mahwah, NJ: Erlbaum.
- Eysenck, M.W. (1992). *Anxiety: The cognitive perspective*. Hove: Erlbaum.
- Eysenck, M.W. (1997). *Anxiety and cognition: A unified theory*. Hove: Psychology Press.
- Eysenck, M.W., & Calvo, M. (1992). Anxiety and performance: The processing efficiency theory. *Cognition and Emotion*, 6, 409–434.
- Farber, I.E., & Spence, K.W. (1953). Complex learning and conditioning as a function of anxiety. *Journal of Experimental Psychology*, 120–125.

- Fivush, R., Peterson, C., & Schwarzmueeller, A. (2002). Questions and answers: The credibility of the child witnesses in the context of specific questioning techniques. In M.L. Eisen, J.A. Quas, & G.S. Goodman (Eds.), *Memory and suggestibility in the forensic interview* (pp. 331–354). Mahwah, NJ: Erlbaum.
- Garven, S., Wood, J.M., Malpass, R.S., & Shaw, J.S. (1998). More than suggestion: The effect of interviewing techniques from the McMartin Preschool Case. *Journal of Applied Psychology*, 83, 347–359.
- Gilstrap, L.L., & Papierno, P.B. (2004). Is the cart pushing the horse? The effects of child characteristics on children's and adults' interview behaviours. *Applied Cognitive Psychology*, 18, 1059–1078.
- Goodman, G., Bottoms, B., Schwartz-Kenney, B., & Rudy, L. (1991). Children's testimony for a stressful event: Improving children's reports. *Journal of Narrative and Life History*, 1, 69–99.
- Goodman, G.S., Rudy, L., Bottoms, B., & Aman, C. (1990). Children's concerns and memory: Issues of ecological validity in the study of children's eyewitness testimony. In R. Fivush, & J. Hudson (Eds.), *Knowing and remembering in young children* (pp. 249–284). New York: Cambridge University Press.
- Gudjonsson, G.H. (1984). A new scale of interrogative suggestibility. *Personality and Individual Differences*, 5, 303–314.
- Gudjonsson, G.H. (1988). Interrogative suggestibility: Its relationship with assertiveness, social-evaluative anxiety, state anxiety and method of coping. *British Journal of Clinical Psychology*, 27, 159–166.
- Gudjonsson, G.H. (1992). *The psychology of interrogations, confessions and testimony*. Chichester: Wiley and Sons.
- Kelly, W.E. (2004). Examining the relationship between worry and trait anxiety. *College Student Journal*, 38, 370–373.
- Krackow, E., & Lynn, S.J. (2003). Is there touch in the game of Twister? The effects of innocuous touch and suggestive questions on children's eyewitness memory. *Law and Human Behavior*, 27(6), 589–604.
- Moston, S. (1989). *Social support and the quality of children's eyewitness testimony*. Unpublished Ph.D. thesis, University of Kent.
- Moston, S., & Engelberg, T. (1992). The effects of social support on children's eyewitness testimony. *Applied Cognitive Psychology*, 6, 61–75.

- Nathanson, R., & Saywitz, K.J. (2003). The effects of the courtroom context on children's memory and anxiety. *Journal of Psychiatry and Law*, 31, 67–98.
- Quas, J.A., & Lench, H. C. (2007). Arousal at encoding, arousal at retrieval, interviewer support, and children's memory for a mild stressor. *Applied Cognitive Psychology*, 21, 289–305.
- Rachman, S. (2004). *Anxiety* (2nd ed.). Hove: Psychology Press.
- Ridley, A.M., & Clifford, B.R. (2004). The effects of anxious mood induction on suggestibility to misleading post-event information. *Applied Cognitive Psychology*, 18, 233–244.
- Ridley, A.M., Clifford, B.R., & Keogh, E. (2002). The effects of state anxiety on the suggestibility and accuracy of child eyewitnesses. *Applied Cognitive Psychology*, 16, 547–558.
- Roberts, K.P., Lamb, M.E., & Sternberg, K.J. (2004). The effects of rapport-building style on children's reports of a staged event. *Applied Cognitive Psychology*, 18, 189–202.
- Sarason, I.G. (1980). Introduction to the study of test anxiety. In I.G. Sarason (Ed.), *Test anxiety: Theory, research and applications* (pp. 3–14). Hillsdale, NJ: Erlbaum.
- Saywitz, K.J., Goodman, G.S., Nicholas, E., & Moan, S.F. (1991). Children's memories of a physical examination involving genital touch: Implications for reports of child sexual abuse. *Journal of Consulting and Clinical Psychology*, 57, 682–691.
- Schooler, J., & Loftus, E.F. (1986). Individual differences and experimentation: Complementary approaches to interrogative suggestibility. *Social Behaviour*, 1, 105–112.
- Spielberger, C.D. (1972). Anxiety as an emotional state. In C.D. Spielberger (Ed.), *Anxiety: Current trend in theory and research* (Vol. 1). New York: Academic Press.
- Spielberger, C.D., Edwards, C.D., Lushene, R., Montuori, J., & Platzek, D. (1973). *STAI-C preliminary manual for the state-trait anxiety inventory for children*. Palo Alto, CA: Consulting Psychologists Press.
- Spielberger, C.D., Gorsuch, R.L., & Lushene, R.E. (1970). *Manual for the state-trait anxiety inventory*. Palo Alto, CA: Consulting Psychologists Press.
- Thierry, K.L., & Spence, M.J. (2004). A real-life event enhances the accuracy of preschoolers' recall. *Applied Cognitive Psychology*, 18, 297–309.

- Tousignant, J.P., Hall, D., & Loftus, E.F. (1986). Discrepancy detection and vulnerability to misleading postevent information. *Memory and Cognition*, 14, 329–338.
- Wells, A. (2005). Worry, intrusive thoughts, and generalized anxiety disorder: The metacognitive theory and treatment. In D.A. Clark (Ed.), *Intrusive thoughts in clinical disorders: Theory, research and treatment* (pp. 119–144). New York: Guilford Press.
- Williams, J.M.G., Watts, F.N., MacLeod, C., & Mathews, A. (1988). *Cognitive psychology and emotional disorders*. Chichester: Wiley and Sons.
- Wolfradt, U., & Meyer, T. (1998). Interrogative suggestibility, anxiety and dissociation among anxious patients and normal controls. *Personality and Individual Differences*, 25, 425–432.
- Wood, J.M., McClure, K.A., & Birch, R.A. (1996). Suggestions for improving interviews in child protection agencies. *Child Maltreatment*, 1, 223–230.
- Zaragoza, M.S., & Lane, S.M. (1994). Source misattributions and the suggestibility of eyewitness memory. *Journal of Experimental Psychology: Learning, Memory and Cognition*, 20, 934–945.

APPENDIX

Summary of the movie clip

The clip showed girls sneaking out of their bedroom at night to find something to eat in the kitchen while the headmistress and the cook are playing cards in the living room. While gathering ingredients to make a cake, the neighbour's boy comes screaming at the kitchen window which scares the girls. Some of the girls drop the eggs, flour and water they were holding, making a mess. Having heard the noise, the headmistress and the cook come running into the kitchen to find the mess and telling the girls to clean everything.

Appendix F

Manuscript derived from Chapters 3 and 4 (Almerigogna, J., Ost, J., Akehurst, L., & Fluck, M. (2008). How interviewers' nonverbal behaviors can affect children's perceptions and suggestibility. *Journal of Experimental Child Psychology*, 100(1), 17-39.)

How interviewers' nonverbal behaviors can affect children's perceptions and suggestibility

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Abstract

We conducted two studies to examine how interviewers' nonverbal behaviors affect children's perceptions and suggestibility. In the first study, 42 8- to 10-year-olds watched video clips showing an interviewer displaying combinations of supportive and nonsupportive nonverbal behaviors and were asked to rate the interviewer on six attributes (e.g., friendliness, strictness). Smiling received high ratings on the positive attributes (i.e., friendly, helpful, and sincere), and fidgeting received high ratings on the negative attributes (i.e., strict, bored, and stressed). For the second study, 86 8- to 10-year-olds participated in a learning activity about the vocal chords. One week later, they were interviewed individually about the activity by an interviewer adopting either the supportive (i.e., smiling) or nonsupportive (i.e., fidgeting) behavior. Children questioned by the nonsupportive interviewer were less accurate and more likely to falsely report having been touched than were those questioned by the supportive interviewer. Children questioned by the supportive interviewer were also more likely to say that they did not know an answer than were children questioned by the nonsupportive interviewer. Participants in both conditions gave more correct answers to questions about central, as opposed to peripheral, details of the activity. Implications of these findings for the appropriate interviewing of child witnesses are discussed.

Keywords: Children's suggestibility; Social support; Interviewer manner and behavior; Children's perceptions

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Introduction

During the past few decades, a great deal of research has examined children's ability to give truthful and accurate eyewitness reports. Although children often were thought to be highly suggestible eyewitnesses (Goodman & Melinder, 2007), recent research has shown that, when questioned appropriately, children can recall information as accurately as adults (Krahenbuhl & Blades, 2006). The main issue is that child witnesses usually tell interviewers less than they actually know;

consequently, more specific types of questions (e.g., multiple-choice questions, leading questions) may be needed to elicit further details from them (Orbach & Lamb, 2000). However, these types of questions also are known to yield more unreliable information from children (Geddie, Fradin, & Beer, 2000), thereby reducing the accuracy of their testimony. Partly in an attempt to overcome these problems in forensic interviews, research recently has shifted focus away from examining the effects of questioning to looking at how various individual and social factors might influence children's accounts (Lindsay, 2002).

Forensic studies investigating the influence of social and situational factors on children's eyewitness testimony have demonstrated that their effects can be as significant as cognitive factors in determining the accuracy of children's reports (e.g., Davis & Bottoms, 2002; Quas & Lench, 2006). For example, Roebbers, Schwarz, and Neumann (2005) looked at the effect of social influence on 10-year-olds' event recall. To manipulate social influence, they interviewed some children in the presence of an adult confederate who was pretending to be interviewed while other children were interviewed alone. They found that those children questioned while the adult confederate was present tended to conform to the social influence. That is, they mainly repeated the adult's answers irrespective of their accuracy. However, Greenstock and Pipe (1997) showed that 5- to 10-year-olds interviewed about a stressful event (i.e., a visit to the dentist) in the presence of a peer were less likely to answer misleading questions incorrectly than were children interviewed alone. A study by Thompson, Clarke-Stewart, and Lepore (1997) demonstrated that the interviewer's emotional tone influenced children's recall. They showed that 5- and 6-year-olds questioned by an interviewer adopting an accusatory tone were more likely to acquiesce to the interviewer's suggestions than were children questioned by an interviewer with a neutral tone. Such experiments clearly illustrate that it is important to consider the social and situational factors affecting children's memory and suggestibility (Quas, Qin, Schaaf, & Goodman, 1997). The focus of the two current studies was on one particular group of social factors, collectively referred to in the literature as interviewer manner or behavior.

Social support and interviewer manner

Being interviewed as a witness or victim of a crime can be a tense and stressful experience, especially for children. Carter, Bottoms, and Levine (1996) argued that this interview anxiety may affect the performance of witnesses (see Quas & Lench, 2006). Therefore, interviewers must find ways to alleviate interviewees' apprehension and feelings of discomfort so as to help them perform at their optimal level of cognitive functioning when giving their testimonies (Sondhi & Gupta, 2005). To put them more at ease, interviewers usually are recommended to build rapport with interviewees before asking questions (Bull, 1995). Roberts, Lamb, and Sternberg (2004) argued that interviewer-provided social support acts by increasing children's feelings of comfort and confidence and reducing their anxiety. Feeling more assertive, children

also tend to be less suggestible (Carter, Bottoms, & Levine, 1996). Social support is defined as a form of assistance and encouragement provided by one person to another, and it induces feelings of well-being, comfort, and security and lowers anxiety in the recipient (Burleson, Albrecht, Goldsmith, & Sarason, 1994). A socially supportive atmosphere can be created in several ways; for example, smiles, frequent eye contact, open body posture, verbal encouragement, and rapport building all have been shown to generate a positive environment (Engelberg & Christianson, 2002). Indeed, nonsupportive interviewers, such as those who tend not to smile, not to look at interviewees, and to be cold and distant, have been shown to be detrimental to the accuracy of testimony provided by child witnesses (Almerigogna, Ost, Bull, & Akehurst, 2007; Davis and Bottoms, 2002).

Goodman, Bottoms, Schwartz-Kenney, and Rudy (1991), for example, interviewed 4- to 7-year-olds in either a supportive or neutral manner about a medical inoculation they had received. The supportive interviewer smiled frequently, complimented the children, and offered them a snack, whereas the neutral interviewer acted in a more objective manner and did not smile, compliment the children, or offer them a snack. Overall, children questioned by the supportive interviewer, as compared with the neutral interviewer, made fewer errors on a free recall task, and young children in particular were less likely to answer misleading and abuse-related questions incorrectly. In Carter and colleagues' (1996) study, the supportive interviewer tried to build rapport with the children by smiling, making frequent eye contact, and encouraging them in their answers, whereas the nonsupportive interviewer did not attempt to build rapport with the children and rarely smiled or made eye contact. These authors found that 5- and 7-year-olds questioned by the supportive interviewer were more resistant to misleading questions than were those questioned by the nonsupportive interviewer. Taken together, these studies show that an interviewer's behaviors can indeed be an important factor in the suggestibility of child witnesses (see Schreiber et al., 2006).

Although most researchers now agree that social support can be beneficial to child interviewees, there is no consensus on how to give social support or on what constitutes supportive and nonsupportive behaviors. For example, a supportive interviewing style has comprised behaviors such as smiling, leaning forward, verbal encouragements, and even giving biscuits or toys (Nathanson & Saywitz, 2003). Furthermore, the broad definition of social support has generally assumed that all such supportive behaviors were equally salient for child witnesses. A previous study we carried out (Almerigogna, Ost, Bull, & Akehurst, 2007) showed that children questioned by a supportive interviewer were more resistant to suggestions than were children questioned by a nonsupportive interviewer. Yet, as in most previous research, the interviewer in that study also used combinations of either supportive or nonsupportive verbal and nonverbal behaviors. No study has attempted to break down social support so as to explore whether certain nonverbal behaviors (e.g., smiling) are more important than others (e.g., body posture) in creating a

supportive atmosphere. More important, which of these nonverbal cues, if any, are particularly salient for child witnesses? The importance of particular behavioral cues for children typically has been overlooked in research on interviewer manner. This is problematic because research in other domains of developmental psychology has shown that children do not always understand or perceive events in the same way as do adults (Donaldson, 1978).

Children's perceptions

Until recently, researchers working within the field of developmental psychology assumed that children perceived the world around them, and more specifically the experiments in which they were participating, in the same way as they (i.e., knowledgeable adults) did. They often explained children's inability to perform well on certain developmental tests in terms of their lack of cognitive resources rather than their different perceptions of the task to be performed or their different comprehension of the adults' instructions. In her critique of classic Piagetian experiments, Donaldson (1978) emphasized the need to consider children's interpretations of social situations, arguing that researchers generally failed to address the very issue they were investigating, namely, children's understanding.

As DePaulo and Coleman (1987) argued, children are sensitive to people's nonverbal behaviors and the messages these may send. For example, Knapp and Hall (1992) stated that children are able to interpret warmth cues based on the amount of eye contact between conversational partners. Yet children might not perceive the world around them in the same way as do adults. Therefore, children might not attend to the same features of an event or a person; what is important to a child may be different from what is important to an adult. Existing studies of interviewer manner have not examined whether what they defined as supportive or nonsupportive behaviors would be perceived as such by their child participants. Hence, it is possible that their manipulations of interviewer manner were not salient for their participants. To address this issue, our first study examined children's perceptions of several supportive and nonsupportive nonverbal behaviors that have been used previously in interviewer manner research.

Three nonverbal behaviors and their opposites were selected on the basis of a review of the relevant literature (e.g., Almerigogna et al., 2007; Davis & Bottoms, 2002; Goodman, Bottoms, Schwartz-Kenney, & Rudy, 1991). Two main criteria were used to select these behaviors. First, the behaviors needed to be forensically relevant and likely to naturally occur in a forensic interview setting. Second, there needed to be research evidence to show that a person adopting such behaviors would be rated as being more (or less) involved in an interaction or would be perceived positively (or negatively) by observers (Mehrabian, 1972). On this basis, the nonverbal behaviors chosen were smiling, body posture, and fidgeting.

Smiling

Smiling often has been used in forensic studies with children as part of a supportive interviewing style; for example, studies by both Carter and colleagues (1996) and Goodman and colleagues (1991) used smiling in their supportive condition, and both studies showed a positive effect of the supportive interviewer on children's resistance to suggestibility. Communication studies have demonstrated that smiling affects the way in which others are perceived and judged (Deutsch, 1990). For example, Rotenberg and colleagues (2003) found that children perceived a smiling adult as being more trustworthy and likeable than an adult who did not smile. Forensically speaking, this is important because trust is seen as a necessary component to build good rapport in an interview (Roberts, Lamb, & Sternberg, 2004). Therefore, it is likely that children would react differently toward an adult who appears to be trustworthy compared with an adult who does not.

Body posture

Nonverbal communication studies have demonstrated that people sitting with closed body posture (i.e., arms and legs crossed) tend to be judged by adult observers as being more cold, rejecting, and passive than do people sitting with open body posture (Machotka, 1965). Furthermore, open body posture is associated with higher ratings of mutual understanding and involvement with another person and, thus, is important in establishing rapport (Tickle-Degnen & Rosenthal, 1990; see also Davies & Westcott, 1999). In their recent study, Quas and Lench (2006) included body posture among other behaviors (e.g., smiling, eye contact, verbal feedback) in their experimental conditions. The results of their interviewer behaviours manipulation demonstrated that children showing increased heart rate at retrieval and interviewed by the low-support adult (e.g., closed body posture, not smiling) had poorer memory than did children in the high-support condition (e.g., open body posture, smiling). However, because that study looked at combinations of both verbal and nonverbal behaviors, the saliency to children of body posture alone is not known.

Fidgeting

Although fidgeting seldom has been investigated in interviewer manner studies with either adults or children, research has demonstrated that it often occurs in interactions and can have significant effects on observers' judgments and reactions. For example, Reece and Whitman (1962) showed that a fidgeting person was perceived as cold and indifferent by adult participants, who also tended to interact significantly less with the fidgeting individual than with one who was not fidgeting. To our knowledge, no study has looked at children's perceptions of an adult's fidgeting behavior; however, because an interviewer may perhaps be fidgeting unconsciously during questioning of a child, we considered it important to include this nonverbal behavior and observe its possible effects on children's impression formation and on their engagement with the interview procedure.

We decided to investigate the effects of these nonverbal behaviors with 8- to 10-year-olds. There were two reasons for this. First, communication studies have shown that before 8 years of age children have difficulty in associating nonverbal behaviors with emotional states (Boyatzis & Satyaprasad, 1994). It seems that although children as young as 4 years of age are able to interpret nonverbal signs, it is around 8 years of age that they come to cognitively understand the dynamics between behaviors and emotions (Boone & Cunningham, 1998). That is, before 8 years of age, although children may react differently to different nonverbal behaviors, they might not be able to appreciate their perceptions of these behaviors (Hortacsu & Ekinici, 1992). Second, although research has demonstrated that young children are particularly susceptible to suggestion, older children are not immune to its impact. However, most child eyewitness studies have been carried out with preschoolers as participants, whereas school-age children, who are also witnesses to or victims of crimes, have been overlooked (Schreiber & Parker, in press). We addressed this gap in the literature in the studies reported here.

Study 1

The aim of our first study was to investigate children's perceptions of different nonverbal behaviors that have been defined previously in the literature as either supportive or nonsupportive. Children viewed video clips showing an interviewer adopting different combinations of the three nonverbal behaviors described above. After each clip, they answered six questions on their perceptions of the interviewer (e.g., whether they found him to be friendly or not). These ratings were then analyzed to determine the impact of supportive and nonsupportive behaviors on children's perceptions of the interviewer. It was predicted that supportive behaviors would be rated more positively by children than would nonsupportive behaviors.

Method

Participants

A total of 42 children participated in this study (26 girls and 16 boys, age range = 8 to 10 years, mean age = 9.05 years, SD = 0.79). The children came from two classrooms of the same school serving a largely middle-class demographic.

Materials

Video clips

The three nonverbal behaviors chosen for the video clips were (a) smiling or not smiling; (b) closed or open body posture (i.e., arms and legs crossed or not), and (c) fidgeting or not fidgeting (i.e., tapping hand and foot or not). These behaviors were mixed so as to give eight different possible combinations (see Table 1 for the eight combinations).

Each combination was filmed four times on four different occasions, and the video clips were filmed in different orders, resulting in 32 clips being

filmed in total. The reason for filming each portrayal four times and in different orders was to avoid possible idiosyncrasies that would be unique to one particular clip and that could influence the results. Each clip lasted approximately 1 min. To control for possible order effects, the 32 clips were randomly grouped in four series of 8. The clips showed a male actor (the interviewer) sitting and talking to an unseen young person. The same actor appeared in all videos. In all of the clips, the actor followed a script based on an extract from the beginning of a typical forensic interview (e.g., "I'm going to ask you a few questions. If you don't know the answer, just tell me . . ."). The actor followed an identical script for all of the video clips regardless of the behavior he was asked to display. The topic of the interviewer's text was a visit to a museum. The young person was out of shot and did not speak at any point. The tone of voice of the interviewer remained as neutral as possible and as similar as possible throughout all of the clips. The actor was blind to the aims of the study.

Table 1
Eight combinations of nonverbal behaviors used in the video clips
Facial expression Body posture Body movement

- 1 Smiling Open Fidgeting
- 2 Smiling Open Not fidgeting
- 3 Smiling Closed Fidgeting
- 4 Smiling Closed Not fidgeting
- 5 Not smiling Open Fidgeting
- 6 Not smiling Open Not fidgeting
- 7 Not smiling Closed Fidgeting
- 8 Not smiling Closed Not fidgeting

Questionnaire booklet

A questionnaire booklet was compiled for this study. It asked children for their age and gender, followed by eight sheets, each with six questions to be answered for each of the eight video clips they saw. The six questions measured six different traits of the interviewer: friendliness, strictness, sincerity, helpfulness, boredom, and stress. The questionnaire was based on similar ones used in previous studies of perception and impression formation (e.g., Brooks, Church, & Fraser, 1986; Thomas, Skitka, Christen, & Jurgena, 2002). Children responded to each perception question by circling a response from 1 to 5, where a score of 1 meant not at all (e.g., "I found the interviewer to be not at all sincere") and a score of 5 meant very (e.g., "I found the interviewer to be very friendly").

Procedure

Four groups, each consisting of 8 to 12 children, watched the video clips. Each child received a questionnaire booklet and was asked to write down his or her age and gender. Each group was then told that it would be watching clips of an interviewer and that group members would need to answer questions about him afterward. The first clip was shown, and then participants were asked to read the questions for the first clip and rate the interviewer on the six dimensions: friendliness, strictness, sincerity, helpfulness, boredom, and stress. They were encouraged to ask the experimenter if and when there was anything they did not understand. All

of the questions were of a practical nature such as "I put a cross in the wrong box, what should I do?," "Is it okay if I circle the answer rather than put a cross?," and "Can I turn the page?" When all children were finished, the second clip was shown and so on for all eight clips. The watching and rating task took between 15 and 20 min for each group. The entire sample was tested over the course of a single day. The testing took place in an unused classroom in the school.

Results

Relations between the six different perception attributes

As shown in Table 2, children's ratings of the positive attributes (friendliness, helpfulness, and sincerity) were positively correlated with each other, as were the negative attributes (strictness, boredom, and stress). The only measures that did not significantly correlate were strictness and helpfulness, $r = -.07$, $p = .21$, and strictness and sincerity, $r = -.01$, $p = .83$.

Effects of interviewer's nonverbal behaviors on children's perceptions

Descriptive statistics for each of the interviewer's behaviors were generated by averaging participants' perception scores across the four different videos in which that behaviour was displayed (e.g., participants saw four videos in which the interviewer was smiling and four videos in which he was not smiling). Table 3 shows the means for the children's ratings of the six perception characteristics for the nonverbal behaviors. These means show that children generally rated a smiling interviewer highly on the positive attributes (friendliness, helpfulness, and sincerity) and rated a fidgeting interviewer highly on the negative attributes (strictness, boredom, and stress). Furthermore, as shown in Table 3, children may have found it difficult to judge an adult's sincerity given that sincerity ratings were very similar across all supportive and nonsupportive nonverbal behaviors.

A preliminary 2 (smiling vs. not smiling) X 2 (open body posture vs. closed body posture) X 2 (fidgeting vs. not fidgeting) X 3 (8 years old vs. 9 years old vs. 10 years old) X 2 (male vs. female) mixed-model analysis of variance (ANOVA) was conducted on the perception scores. Because this did not show any significant effect of gender, this variable was excluded from the subsequent analysis. Therefore, a 2 (smiling vs. not smiling) X 2 (open body posture vs. closed body posture) X 2 (fidgeting vs. not fidgeting) X 3 (8 years old vs. 9 years old vs. 10 years old) mixed-model ANOVA was performed to test the effects of the nonverbal behaviors on children's perceptions. The dependent variables were children's ratings on the six perception questions.

The analysis revealed that there were multivariate effects for the smiling behavior, Wilks's $k = .74$, $F(6, 307) = 17.80$, $p < .001$, for the fidgeting behavior, Wilks's $k = .70$, $F(6, 307) = 22.31$, $p < .001$, and for the age variable, Wilks's $k = .93$, $F(12, 614) = 1.85$, $p = .04$. Two interactions were significant: smiling and fidgeting behaviors, Wilks's $k = .91$, $F(6, 307) = 5.38$, $p < .001$, and body posture and fidgeting, Wilks's $k = .94$, $F(6, 307)$

= 3.37, $p = .003$. The main effect for body posture and all other interactions were not significant.

Univariate analyses were carried out for the two significant interactions. These showed that children gave higher ratings of friendliness when the interviewer was smiling and not fidgeting ($M = 4.08$, $SD = 0.84$) than when he was not smiling and fidgeting ($M = 2.80$, $SD = 1.16$). The interviewer was also rated as more strict, bored, and stressed when he was not smiling and fidgeting (strictness: $M = 4.11$, $SD = 0.88$; boredom: $M = 4.21$, $SD = .82$; stress: $M = 4.13$, $SD = 0.80$) than when he was smiling and not fidgeting (strictness: $M = 2.39$, $SD = 1.17$; boredom: $M = 2.66$, $SD = 1.25$; stress: $M = 2.43$, $SD = 1.24$). The significant interaction between body posture and fidgeting revealed that children gave higher ratings of friendliness and lower ratings of boredom when the interviewer was sitting with an open body posture and not fidgeting (friendliness: $M = 3.99$, $SD = 0.88$; boredom: $M = 2.46$, $SD = 1.02$) than when the interviewer was sitting with a closed body posture and fidgeting (friendliness: $M = 3.48$, $SD = 1.22$; boredom: $M = 3.53$, $SD = 1.32$).

The univariate analysis of the age variable indicated that 8-year-olds ($M = 3.51$, $SD = 1.15$) rated the interviewer as more strict than did 9-year-olds ($M = 3.20$, $SD = 1.35$) and 10-year-olds ($M = 2.75$, $SD = 1.26$).

Discussion

The results of this first study showed that the interviewer was rated more positively when smiling and was rated more negatively when fidgeting. The differences in body posture alone (i.e., open vs. closed) did not appear to be particularly salient in children's ratings of the interviewer. Smiling and fidgeting, therefore, were chosen for a second study in which we tested the effects that these behaviors might have on children's ability to accurately recall details of a naturalistic event when they were questioned about that event both appropriately (with neutral questions) and inappropriately (with misleading questions).

Study 2

The aim of our second study was to examine the effect of children-perceived supportive and nonsupportive nonverbal behaviors on children's accuracy for an event. The children took part in a learning activity about the vocal chords. One week later, they were interviewed individually about this event by an interviewer adopting either the supportive behavior (i.e., smiling) or nonsupportive behavior (i.e., fidgeting). The children were asked a series of questions, some of which were neutral and some of which were misleading. In line with previous research (e.g., Almerigogna et al., 2007; Carter et al., 1996; Davis & Bottoms, 2002), it was predicted that children in the nonsupportive condition would answer more of the suggestive questions incorrectly than would those in the supportive condition. Previous studies have shown that information about central details of an event usually is more easily

accessible than information about peripheral details (Ibabe & Sporer, 2004). Central details also tend to be more difficult to mislead on than do peripheral details (Christianson & Loftus, 1991). The interview questions used in the current study were also designed to have some questions referring to central information of the activity and some questions referring to peripheral details. Therefore, the effects of question details (i.e., central and peripheral) on children's accuracy were also examined. In line with previous studies (e.g., Candel, Merckelbach, Jelicic, Limpens, & Widdershoven, 2004; Wright & Stroud, 1998), we predicted that children would respond more accurately to questions about central details of the learning activity than to questions referring to peripheral details. One question asked children whether the adult had touched them during the learning activity. Because adult touches have been the focus of previous work (e.g., Krackow & Lynn, 2003; Tobey & Goodman, 1992) and often are of significance to forensic investigations, we explored whether children's responses to this item would be affected by interviewer manner. Specifically, we predicted that children questioned by the nonsupportive interviewer would be more likely to report this erroneous event than would children questioned by the supportive interviewer.

Method

Participants

A total of 86 children (43 girls and 43 boys), ages 8 to 10 years ($M = 8.99$ years, $SD = 0.63$), participated in this study. All of the participants were pupils from the same primary school in a largely middle-class area and came from four different classrooms. None of the children who participated in Study 1 took part in Study 2. Girls and boys were equally distributed across the conditions.

Materials

Event

A learning activity was designed so that the children participated in small groups in the event they were to be questioned about later. A speech therapist, who was blind to the aims of the study, taught the children about the vocal chords. She explained what vocal chords were, indicated where they could be found, and showed the children what they looked like by drawing three sketches on a board representing the vocal chords at rest, while inhaling, and when sick. Then she explained how the vocal chords worked, making sounds as examples. She asked the children to make the sounds "aaaaah," "eeeeeeh," and "rrrrrrrh" with her and to feel on their own chests and throats the vibrations of the sounds they were making. She then thanked the children for their time and reminded them to take good care of their voices. The event lasted approximately 10 min.

Interviewer manner manipulation

Supportive and nonsupportive interviewer behaviors were operationalized in line with the findings of the first study. Thus, in the supportive interviews, the interviewer was smiling and avoiding fidgeting

behaviors, whereas in the nonsupportive interviews, the interviewer was not smiling but was fidgeting (i.e., tapping hand and foot). The tone of voice and the manner in which the interviewer was dressed remained constant throughout all interviews and across conditions. The same female interviewer (blind to the aim of the study) conducted all of the interviews, which took place in the same room at the school. It was not the same interviewer as was pictured in the videos for Study 1.

Structure of the interview and interview questions

At the beginning of the interview, the interviewer explained to the children what the interview would be about:

Let me tell you why we're both here today. We're here because I would like to know what happened last week when you participated in that learning activity. Do you remember? Well, I'm just going to ask you a few questions, is that okay? If I ask you a question and you don't know the answer, that's fine; just tell me that you don't know. Also, if I ask a question that you don't understand, don't be afraid to tell me; I will try to explain the question again. Remember that I wasn't there, I don't know what happened, so don't be afraid to say everything you can remember even if you think it's silly or not important, okay?

During the interview, the children were asked 18 questions about the learning activity in which they participated. The questions were asked in the same temporal order in which they occurred in the event. Of the 18 questions, 5 were neutral and 13 contained some form of misinformation (see Appendix A for a list of interview questions). Furthermore, 3 neutral questions and 7 suggestive questions referred to central details of the learning activity, whereas 2 neutral questions and 6 suggestive questions concerned peripheral details of the activity. The differentiation between central and peripheral details was based on a pilot study from which free recalls were gathered from a sample of similar-age school children who took part in the same learning event but who did not participate in the main study. The frequencies with which details were reported in free recall were counted. These frequencies were used to categorize a detail as either central (i.e., the detail was mentioned by 66% of the children) or peripheral (i.e., the detail was mentioned by 33% of the children).

Procedure

In groups of four, children participated in a learning activity about the vocal chords. The event lasted approximately 10 min for each group. One week later, children were interviewed individually following the structure detailed above. Interviews lasted between 10 and 15 min and took place at the children's school in a room adjacent to their classroom. Children's answers to the interview questions were recorded by the interviewer. All answers were short in length, so the interviewer was easily able to accurately record them by hand. Children were then thanked for their participation and returned to their normal class activities.

Coding and measures

An accuracy score was calculated by adding up the number of correct answers to the questions for each child. Each answer was coded as either accurate if the answer was judged as correct, inaccurate if the

answer was judged as incorrect, or “don’t know” if the child stated that he or she did not know the answer. Children’s answers on the interviewer’s coding sheets were coded by the first author and by a second coder who was blind to the aim of the experimental conditions. Cohen’s kappa was .92, which can be considered excellent agreement, according to Fleiss (1981). Any disagreements were resolved by discussion between the two coders and the first author’s classification was used.

The number of accurate answers for each type of question (i.e., neutral central, neutral peripheral, suggestive central, or suggestive peripheral) was then computed. Because the number of questions was uneven for each type, responses were recoded into proportions ranging from 0 to 1. This was done by dividing the total number of accurate responses to each type of question by the number of questions in that category. For example, scores for the suggestive central questions were divided by 7 because there were seven suggestive central questions. The “don’t know” answers were excluded from the accuracy scores, and the overall proportion of times children gave “don’t know” responses was recorded separately.

Results

Effect of interviewing style, question type, and question detail on children’s accuracy

Initial analysis revealed that, overall, children were quite accurate. Across all conditions and questions, the mean proportion accuracy score was .61 (SD = .30). Means and standard deviations for the proportions of accurate, inaccurate, and “don’t know” answers are shown in Table 4, which indicates that the children, taken as a whole, gave more erroneous answers when questioned by the nonsupportive interviewer than when questioned by the supportive interviewer. Children in the supportive condition were more likely to say that they did not know an answer than were those in the nonsupportive condition. Nonparametric testing of the “don’t know” answers confirmed this, $U = 287$, $z = -5.65$, $p < .001$.

A preliminary 2 (supportive interviewing style vs. nonsupportive interviewing style) X 2 (suggestive question type vs. neutral question type) X 2 (central question detail vs. peripheral question detail) X 3 (8 years old vs. 9 years old vs. 10 years old) X 2 (male vs. female) mixed-model ANOVA was then conducted on the accuracy scores. However, because there were no main effects and no interactions for either age or gender, these two factors were excluded from the main analysis reported here. Therefore, a 2 (supportive interviewing style vs. nonsupportive interviewing style) X 2 (suggestive question type vs. neutral question type) X 2 (central question detail vs. peripheral question detail) mixed-model ANOVA was carried out on the proportion scores of accurate answers. Interviewing style was a between-participants variable, and both question type and question detail were within-participants variables.

The results demonstrated that children gave more accurate answers when questioned by the supportive interviewer ($M = .69$, $SD = .30$) than when questioned by the nonsupportive interviewer ($M = .52$, SD

= .28), $F(1, 84) = 25.73$, $p < .001$, partial $g^2 = .23$. They gave more accurate answers to suggestive questions ($M = .68$, $SD = .20$) than to neutral questions ($M = .53$, $SD = .36$), $F(1, 84) = 22.26$, $p < .001$, partial $g^2 = .21$. These main effects were qualified by a significant interaction between interviewer style and question type, $F(1, 84) = 10.48$, $p = .002$, partial $g^2 = .11$. As shown in Fig. 1, children gave more accurate answers to the suggestive questions when questioned by the supportive interviewer than when questioned by the nonsupportive interviewer, but their answers to the neutral questions did not differ as a function of whether the interviewer behaved in a supportive or nonsupportive manner.

There was also a main effect of question detail, with children providing more accurate answers to questions about central details ($M = .72$, $SD = .25$) than to questions about peripheral details ($M = .49$, $SD = .31$), $F(1, 84) = 136.10$, $p < .001$, partial $g^2 = .62$. Again, however, this was qualified by a significant interaction between question type and question detail, $F(1, 84) = 67.84$, $p < .001$, partial $g^2 = .45$. Fig. 2 shows that neutral or suggestive questioning did not affect children's accuracy in relation to central details of the event but that questioning did affect their accuracy in relation to peripheral details. Children were more accurate when questioned about peripheral details in a suggestive manner as compared with a nonsuggestive manner. All other interactions were not significant.

Answers to "touch" question

Further analyses were carried out to examine the extent to which children were likely to incorrectly report that they had been touched by the confederate during the learning event. One of the questions in the interview (Question 17) asked "Where on your body did the lady touch you to feel the vibrations?" even though, in fact, no touch had occurred. Of the 86 participants, only 8 (9%) falsely reported having been touched by the confederate during the learning activity. Closer examination of these 8 participants showed that all of them had been questioned by the nonsupportive interviewer. That is, 19% of the children questioned by the nonsupportive interviewer reported an adult touch where there had been none.

Discussion

The aim of this second study was to examine the effects of a child-perceived supportive and nonsupportive interviewer nonverbal behavior on children's eyewitness testimony. The results showed that, overall, children were quite resistant to suggestions given that they provided high numbers of accurate answers to misleading questions. Despite this, the two different interviewing styles had a significant effect on children's accuracy. Children questioned by the interviewer displaying the nonsupportive nonverbal behavior (i.e., fidgeting) answered significantly fewer of the misleading questions correctly than did children questioned by the supportive (i.e., smiling) interviewer. There was no difference between the two conditions in terms of correct answers to neutral

questions. There also was an effect of question detail, with children giving more correct answers to questions about central details of the event than to questions referring to peripheral details. Questions about peripheral details were also better answered when asked in a suggestive manner than when asked in a neutral manner. Moreover, children questioned by the supportive interviewer said that they did not know an answer more often than did children questioned by the nonsupportive interviewer. Furthermore, there was a clear effect of interviewing style on children's tendency to incorrectly report that they had been touched during the learning activity, with all eight children who falsely reported such a touch having been questioned by the nonsupportive interviewer.

General discussion

Summary of findings

The first study looked at children's perceptions of different supportive and nonsupportive interviewer nonverbal behaviors. The results showed that the interviewer was rated more positively when he was smiling and was rated more negatively when he was fidgeting. The second study demonstrated that these children-perceived supportive and nonsupportive nonverbal behaviors affected children's accuracy in interviews. Children questioned by the supportive interviewer, as compared with the nonsupportive interviewer, gave more accurate responses to suggestive questions, were more likely to say that they did not know an answer, and were less likely to falsely report having been touched by the adult during the activity. Overall, children also gave more correct answers to questions referring to central details of the event than to those about peripheral details.

Children's perceptions and nonverbal behaviors

The first study was conducted to examine whether nonverbal behaviors viewed as supportive or nonsupportive in the child witness literature were perceived as such by children. The results showed that children gave high ratings of friendliness and helpfulness to the interviewer when he was smiling and gave high ratings of strictness, boredom, and stress when he was fidgeting. Otta, Abrosio, and Hoshino (1996) showed that smiling individuals were perceived as more kind, attractive, and happy, and Rockwell and Hubbard (1999) demonstrated that lawyers displaying nervous gestures such as fidgeting were seen as less credible and less interested in the interaction. The current results also demonstrated that children's perceptions of the interviewer were not significantly affected by body posture. Forensically speaking, this is quite surprising because many previous studies on interviewer-provided social support have included this behavior in their manipulations (e.g., Carter et al., 1996; Davis & Bottoms, 2002; Quas & Lench, 2006). In a study with adults, Machotka (1965) showed that people sitting with a closed body posture were perceived by observers as cold, rejecting, and passive. However, a study with children by Neil (1989) showed a very weak effect

of a teacher's body posture on children's perceptions. The current results suggest that a closed body posture may have an effect only in combination with other negative nonverbal behaviors (e.g., fidgeting, not smiling) but that its effects might be diminished with more salient positive nonverbal behaviors (i.e., smiling, not fidgeting) (Burgoon, Buller, Hale, & deTurck, 1984). This does not mean that an interviewer's body posture is not important when trying to create a comfortable environment for interviewees; rather, it means that the difference between open and closed body postures might be less salient for children's impression formation than is the difference between a smiling person and a nonsmiling person (Grahe & Bernieri, 1999).

Communication researchers have shown that negative behaviors such as those used in the current studies (i.e., not smiling, closed body posture, and fidgeting) usually communicate low interaction involvement and intimacy (Mehrabian, 1972). That is, people exhibiting negative nonverbal behaviors tend to be perceived as indifferent to the interaction and usually are evaluated less positively than people showing higher levels of interaction involvement (McMahan, 1976). Burgoon and Walther (1990) argued that this negative evaluation is due to the fact that by behaving in such a manner, these people violate others' expectations of what behaviors are appropriate in interactions. However, more research is definitely needed before we can say precisely which behaviors are important and which should be controlled in interviews with children.

Interviewing styles and memory and suggestibility

Consistent with previous studies (e.g., Almerigogna et al., 2007; Carter et al., 1996; Davis & Bottoms, 2002), we found no effect of interviewing styles on children's accuracy when they were questioned using neutral nonmisleading questions. Although overall the accuracy scores were lower for neutral questions than for suggestive questions, this might be due to the small number of questions in the two neutral categories. That is, three neutral central questions and two neutral peripheral questions might not have been enough to correctly measure children's memory accuracy. Another explanation for these findings might come from the interview questions. Some of the suggestive questions may have provided children with more memory cues than did some of the neutral questions. An example was Question 11, a suggestive question: "She showed you some vocal chords. How? Did she show you photographs?" Asking children whether they were shown photographs may have reminded them of the drawings they actually saw, thereby increasing their resistance to that particular suggestion. A contrary example was Question 15, a neutral question: "Where on your body did you have to feel the vibrations?" This open-ended question may have been more difficult for children to answer (Poole & Lamb, 1998) because it provides no cues to the possible answer. Furthermore, the high overall level of accurate answers to suggestive questions implied that children were quite able to reject misleading information and instead report correct information.

Most important, the results showed a greater ability for children to resist suggestions when they were questioned by the supportive interviewer than by the nonsupportive interviewer. This is in accordance with previous studies that have shown a positive effect of interviewer-provided social support on children's suggestibility (e.g., Davis & Bottoms, 2002; Quas & Lench, 2006). Study 1 showed that children gave high ratings on the negative attributes (i.e., strictness, boredom, and stress) to a fidgeting interviewer. As stated earlier, Mehrabian (1972) argued that many negative nonverbal cues are interpreted by observers as reflecting a lack of immediacy and involvement. Imhoff and Baker-Ward (1999) argued that children may be less prone to oppose an adult who they view as distant and strict. Children might have complied more with whatever the nonsupportive interviewer was saying, thereby increasing their suggestibility, whereas in the supportive condition children felt more at ease and confident, enabling them to disagree more with the interviewer (Lyon, 1999).

Interviewing styles and "don't know" answers

With regard to children's tendency to give "don't know" responses, the current studies showed that children questioned by the supportive interviewer reported not knowing an answer more often than did children questioned by the nonsupportive interviewer. Few studies have investigated children's "don't know" responses simply because children tend not to give such an answer spontaneously (Lamb, Sternberg, & Esplin, 1998; Memon and Vartoukian, 1996). A study by Howie and Dowd (1996) showed that 7- to 10-year-olds who were told before an interview that they were not expected to know all of the answers gave "don't know" responses significantly more often than did children who were told that they should know all of the answers. By being told that it was acceptable not to know an answer, children might have felt more assertive and empowered to do so. Furthermore, Waterman, Blades, and Spencer (2004) demonstrated that 5- to 9-year-olds were less likely to give "don't know" responses to an interviewer who they believed already knew the answers than to an interviewer who did not have prior knowledge about the event in question. Therefore, children's tendency to give "don't know" responses can be affected by social factors.

The current results do not support Carter and colleagues' (1996) findings that interviewer-provided social support had no effect on the number of children's "don't know" responses. In the current studies, children were explicitly told in both the supportive and nonsupportive conditions that they should give a "don't know" response rather than try to answer a question to which they did not know the answer. The positive effects of supportive interviewer behavior, therefore, might have made children feel more at ease and confident, whereas in the nonsupportive condition children, feeling more vulnerable and anxious, might have felt more compelled to give an answer even when they did not know it (Perry & Wrightsman, 1991). This, combined with the explicit instructions that encouraged or allowed "don't know" responses from children, may have

led to the current findings. However, it should be noted that, to meet the aims of a forensic interview (i.e., discover the truth), “don’t know” responses are not always desirable, for example, when a child knows the answer to a question but simply says that he or she does not know it.

Interviewing styles and answer to the “touch” question

The effects of interviewing style on children’s answers to the “touch” question (“Where on your body did the lady touch you to feel the vibrations?”) were clear. All eight children who incorrectly reported having been touched by the adult during the learning activity had been questioned by the nonsupportive interviewer. Because nothing particular in the structure of the question could account for this bias (other questions referred to the children’s bodies, and the same question was asked in both the supportive and nonsupportive conditions), it was arguably due to the effects of the interviewer’s nonsupportive behaviour when the question was asked. The diversity of children’s answers to this question also showed inconsistencies with the action of the event (i.e., feeling the vibrations of a sound), with touches being reported on the knee, the arm, and the forehead. Previous studies have shown that children usually do not falsely report that they have been touched. For example, Saywitz, Goodman, Nicholas, and Moan (1991) interviewed 5- and 7-year-old girls about a physical examination and found that hardly any of them incorrectly assented to a question about a genital touch. Likewise, Tobey and Goodman (1992) showed that 4-year-olds did not falsely claim to have been kissed on the mouth by a nurse. However, these studies asked children for an abuse-related touch, that is, a touch or action on a very intimate part of their body. Such touches may be more salient to children than is an innocuous touch to feel vibrations on the throat. A study by Krackow and Lynn (2003) showed that 4- to 6-year-olds were more likely to incorrectly acquiesce to questions about innocuous touches taking place during a game of Twister (e.g., “Did Amy touch your arm?”) than to questions concerning abuse touches (e.g., “Did Amy touch your bottom?”). The current studies questioned children about an innocuous touch that could have taken place during the event, and none of the children reported having been touched in a place that would raise concerns. Nevertheless, determining the truthfulness of children’s reports of bodily touches clearly is important for abuse investigators, and it is encouraging that in the current studies none of the children in the supportive condition falsely claimed to having been touched, confirming the positive effects of interviewer-provided social support.

Question details and memory and suggestibility

Information about an event is not stored uniformly in memory (Ibabe & Sporer, 2004). Information concerning central details of an event usually is more readily accessible than information about peripheral details and, therefore, is more difficult to distort (Christianson & Loftus, 1991). In Study 2, we explored the effects of question details (i.e., central and peripheral) on children’s answers. Similarly to previous studies (e.g., Candel,

Merckelbach, Jelicic, Limpens, & Widdershoven, 2004; Wright & Stroud, 1998), we found that children were more accurate on questions concerning central details of the learning activity than on questions referring to peripheral details. Children were also more easily misled on questions about peripheral details than on questions about central details. The attentional narrowing hypothesis states that central details are better remembered because they produce more emotion at encoding, and this tends to direct most of the attentional resources toward them (Christianson, 1992). Such a mechanism leaves few resources for the less emotional peripheral information, which is then less well encoded and, therefore, less well remembered (Roebbers & Schneider, 2000). For example, in an armed robbery with a gun, witnesses' attention tends to focus on the object provoking their emotions (i.e., the gun) rather than on more secondary information (e.g., features of the robber, the robber's clothes). Furthermore, the poststimulus elaboration hypothesis states that people tend to talk and think more about the central actions and characters of an event than about the peripheral details (Christianson, Loftus, Hoffman, & Loftus, 1991). This elaboration helps people to rehearse the information, making it more easily remembered later. These hypotheses help to explain the current finding regarding question details and children's accuracy. Our results also showed that children were more accurate on suggestive questions about peripheral details than on neutral questions about peripheral details. This outcome could be due to the low number of questions in the neutral peripheral category (i.e., two), which did not give enough range for children to be more accurate when comparing them to the suggestive peripheral questions. The best way to overcome this in the future would be to ensure that equal numbers of questions are present in each category.

Limitations of the current studies

As Donaldson (1978) argued, adults should not infer what children may understand about a situation but rather should ask them for their views. Although Study 1 provided data regarding children's perceptions of an interviewer displaying different nonverbal behaviors, no data on how adults may have perceived these same behaviors were gathered. Such data would have allowed an absolute comparison between the adult's and children's perceptions of an identical situation and an examination of possible differences and similarities.

Study 2 was designed to investigate children's accuracy as a function of interviewer behaviour (i.e., smiling and fidgeting). However, in each condition, the results may be confounded by the absence of the opposite behavior. For example, children in the nonsupportive group showed less accuracy on suggestive questions than did children in the supportive group. Was this due to the interviewer's fidgeting behavior, or was it due to the fact that the interviewer was not smiling? Similarly, the positive effects demonstrated by the smiling interviewer may be affected by the nonfidgeting manner. Children's perception ratings from Study 1 give us hope that this was not a confounding variable given that children

rated the interviewer more negatively when he was not smiling and fidgeting than when he was not fidgeting and smiling. However, to resolve this question conclusively, future research should include two additional interviewing conditions (i.e., smiling/fidgeting and not smiling/not fidgeting) to complete the experimental design and control for any potential confounding effects.

As Ackil and Zaragoza (1998) claimed, from 8 years of age onward, children become more resistant to misinformation. The current results supported this argument with children's overall high level of accuracy on suggestive questions. However, it should be remembered that just because research has demonstrated that older children show lower levels of susceptibility to suggestions than do preschoolers does not mean that older children are not suggestible at all. Therefore, it remains important to continue studying the effects of factors such as interviewers' behaviors on older children's accuracy as well. Indeed, the current studies showed that interviewer-provided social support did influence children's suggestibility. Future research may want to compare the effects of interviewers' behaviors on different age groups.

Finally, independent ratings of the interviews would have helped to ensure that the interviewer faithfully carried out the manipulation (supportive and nonsupportive) consistently throughout all interviews. However, it was not possible to videotape the interviews in the school because many parents were uncomfortable with this despite assurances of the confidential nature of the recordings and the restrictions on access.

Conclusion

The current studies have highlighted the importance of social factors, such as interviewers' nonverbal behaviors, in forensic interviews with children. Two different interviewing styles, distinguished by two nonverbal behaviors (i.e., smiling and fidgeting), had significant effects on children's perceptions of the interviewer and on their suggestibility. Children showed a strong ability to accurately reject misinformation, further increasing our confidence that they can be quite resistant to misleading suggestions. The current results may also help to understand the processes at play in real court cases. In court interviews, one would expect a child witness to be questioned by a supportive prosecution attorney and then cross-examined by a nonsupportive defense lawyer. The impact of these two types of interviewing style on a witness's testimony is an important research subject because it is at play in everyday court cases. Therefore, research should continue to identify and investigate social variables (e.g., interviewers' verbal behaviors) that may influence children's testimonies. Indeed, better understanding of the effects of interviewers' behaviors (e.g., on children's perceptions) should allow professionals to control and manipulate them in interviews so as to increase the reliability of eyewitness reports (Roberts et al., 2004). Such knowledge also should help to develop more appropriate and less stressful procedures for interviewing child witnesses.

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Appendix A. Interview questions and correct answers

1. What did she talk to you about? (neutral–central) Vocal chords, voice, what's inside our throat, what we talk with, etc.
2. How long did she say the activity would last for? Five minutes? (suggestive–central) No, 10 minutes.
3. What color was her skirt? (suggestive–peripheral) She wasn't wearing a skirt, she had pants, etc.
4. How many vocal chords did she say people have? Three? Four? (suggestive–central) Two.
5. Can you show me where on your face are your vocal chords? (suggestive–central) Not on my face, in my throat (or pointing to throat), etc.
6. She talked about sick vocal chords too. How big can sick vocal chords become? (suggestive– peripheral) She didn't say that (she talked of their color not their size).
7. How can your vocal chords be sick? (neutral–peripheral) When you scream too much, speak loudly, etc.
8. Someone knocked at the door and interrupted at one point. Who was it? (suggestive– peripheral) Nobody knocked on the door.
9. That bump some people have in their throat, it has the name of a vegetable. What is it called? (suggestive–central) There's no vegetable, it's an apple.
10. She took something out of her pocket. What was it? (neutral–peripheral) A Kleenex, a handkerchief.
11. She showed you some vocal chords. How? Did she show you photographs? (suggestive– central) No, she drew them on the board.
12. The chalk she had in her hand, did she throw it away? (suggestive–peripheral) Yes.
13. You made sounds to feel vibrations, what sounds did you make? (neutral–central) Aaaaah, eeeeeeh, rrrrrrh.
14. What word did she ask you to say? (suggestive–peripheral) None, she didn't ask to say a word, etc.
15. Where on your body did you have to feel the vibrations? (neutral–central) Throat, chest, neck.
16. Did you also have to put your hands on your ears? (suggestive–central) No, I didn't.
17. Where on your body did the lady touch you to feel the vibrations? (suggestive–central) She didn't touch me, nowhere.

18. At the end, did Ms. _____, your teacher, say that she really enjoyed participating in the activity with you? (suggestive-peripheral) No, she wasn't there, etc.

References

- Ackil, J. K., & Zaragoza, M. S. (1998). Memorial consequences of forced confabulation: Age differences in susceptibility to false memories. *Developmental Psychology*, 34, 1358–1372.
- Almerigogna, J., Ost, J., Bull, R., & Akehurst, L. (2007). A state of high anxiety: How non-supportive interviewers can increase the suggestibility of child witnesses. *Applied Cognitive Psychology*, 21, 963–974.
- Boone, R. T., & Cunningham, J. G. (1998). Children's decoding of emotion in expressive body movement: The development of cue attunement. *Developmental Psychology*, 34, 1007–1016.
- Boyatzis, C. J., & Satyaprasad, C. (1994). Children's facial and gestural decoding and encoding: Relationships between skills and with popularity. *Journal of Nonverbal Behavior*, 18, 37–55.
- Brooks, C. I., Church, M. A., & Fraser, L. (1986). Effects of duration of eye contact on judgments of personality characteristics. *Journal of Social Psychology*, 126, 71–78.
- Bull, R. (1995). Good practice for video recorded interviews with child witnesses for use in criminal proceedings. In G. Davies, S. Lloyd-Bostock, & C. Wilson (Eds.), *Psychology, law, and criminal justice* (pp. 100–117). Berlin: Walter de Gruyter.
- Burgoon, J. K., Buller, D. B., Hale, J. L., & deTurck, M. A. (1984). Relational messages associated with nonverbal behaviors. *Human Communication Research*, 10, 351–378.
- Burgoon, J. K., & Walther, J. B. (1990). Nonverbal expectancies and the evaluative consequences of violations. *Human Communication Research*, 77, 232–265.
- Burleson, B. R., Albrecht, T. L., Goldsmith, D. J., & Sarason, I. G. (1994). Introduction: The communication of social support. In B. R. Burleson, T. L. Albrecht, & I. G. Sarason (Eds.), *Communication of social support: Messages, interactions, relationships, and community* (pp. xi–xxx). Thousand Oaks, CA: Sage.
- Candel, I., Merckelbach, H., Jelicic, M., Limpens, M., & Widdershoven, K. (2004). Children's suggestibility for peripheral and central details. *Journal of Credibility Assessment and Witness Psychology*, 5(1), 9–18.
- Carter, C. A., Bottoms, B. L., & Levine, M. (1996). Linguistic and socioemotional influences on the accuracy of children's reports. *Law and Human Behavior*, 20, 335–358.
- Christianson, S. A. (1992). Emotional stress and eyewitness memory: A critical review. *Psychological Bulletin*, 112, 284–309.
- Christianson, S. A., & Loftus, E. F. (1991). Remembering emotional events: The fate of detailed information. *Emotion and Cognition*, 5, 81–108.
- Christianson, S. A., Loftus, E. F., Hoffman, H., & Loftus, G. R. (1991). Eye fixations and accuracy in detail memory for emotional versus neutral events. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 17, 693–701.
- Davies, G. M., & Westcott, H. L. (1999). Interviewing child witnesses under the memorandum of good practice: A research review. London: Home Office.
- Davis, S. L., & Bottoms, B. L. (2002). Effects of social support on children's eyewitness reports: A test of the underlying mechanism. *Law and Human Behavior*, 26, 185–215.
- DePaulo, B. M., & Coleman, L. M. (1987). Verbal and nonverbal communication of warmth to children, foreigners, and retarded adults. *Journal of Nonverbal Behavior*, 11, 75–88.
- Deutsch, F. M. (1990). Status, sex, and smiling: The effect of role on smiling in men and women. *Personality and Social Psychology Bulletin*, 16, 531–540.
- Donaldson, M. (1978). *Children's minds*. London: Fontana.
- Engelberg, E., & Christianson, S. (2002). Stress, trauma, and memory. In M. L. Eisen, J. A. Quas, & G. S. Goodman (Eds.), *Memory and suggestibility in the forensic interview* (pp. 143–163). Mahwah, NJ: Lawrence Erlbaum.
- Fleiss, J. L. (1981). *Statistical methods for rates and proportions*. New York: John Wiley.
- Geddie, L. F., Fradin, S., & Beer, J. (2000). Child characteristics which impact accuracy of recall and suggestibility in preschoolers: Is age the best predictor? *Child Abuse and Neglect*, 24, 223–235.
- Goodman, G. S., & Melinder, A. (2007). Child witness research and forensic interviews of young children: A review. *Legal and Criminological Psychology*, 12(1), 1–19.

- Goodman, G. S., Bottoms, B. L., Schwartz-Kenney, B., & Rudy, L. (1991). Children's testimony for a stressful event: Improving children's reports. *Journal of Narrative and Life History*, 1, 69–99.
- Grahe, J. E., & Bernieri, F. J. (1999). The importance of nonverbal cues in judging rapport. *Journal of Nonverbal Behavior*, 23, 253–269.
- Greenstock, J., & Pipe, M. E. (1997). Are two heads better than one? Peer support and children's eyewitness reports. *Applied Cognitive Psychology*, 11, 461–483.
- Hortacsu, N., & Ekinci, B. (1992). Children's reliance on situational and vocal expression of emotions: Consistent and conflicting cues. *Journal of Nonverbal Behavior*, 16, 231–247.
- Howie, P. M., & Dowd, H. J. (1996). Self-esteem and the received obligation to respond: Effects on children's testimony. *Legal and Criminological Psychology*, 1, 197–209.
- Ibabe, I., & Sporer, S. L. (2004). The influence of question form on the accuracy and confidence of memories for central and peripheral action and descriptive details of an event. *Applied Cognitive Psychology*, 18, 711–726.
- Imhoff, M. C., & Baker-Ward, L. (1999). Preschoolers' suggestibility: Effects of developmentally appropriate language and interviewer supportiveness. *Applied Developmental Psychology*, 20, 407–429.
- Knapp, M. L., & Hall, J. A. (1992). *Nonverbal communication in human interaction*. Fort Worth, TX: Holt, Rinehart & Winston.
- Krackow, E., & Lynn, S. J. (2003). Is there touch in the game of Twister? The effects of innocuous touch and suggestive questions on children's eyewitness memory. *Law and Human Behavior*, 27, 589–604.
- Krahenbuhl, S., & Blades, M. (2006). The effects of interviewing techniques on young children's responses to questions. *Child: Care, Health, and Development*, 32, 321–331.
- Lamb, M. E., Sternberg, K. J., & Esplin, P. W. (1998). Conducting investigative interviews of alleged sexual abuse victims. *Child Abuse and Neglect*, 22, 813–823.
- Lindsay, D. S. (2002). Children's source monitoring. In H. L. Westcott, G. M. Davies, & R. H. C. Bull (Eds.), *Children's testimony: A handbook of psychological research and forensic practice* (pp. 83–98). Chichester, UK: John Wiley.
- Lyon, T. D. (1999). The new wave of suggestibility research: A critique. *Cornell Law Review*, 84, 1004–1087.
- Machotka, P. (1965). Body movements as communication. *Dialogues: Behavioral Science Research*, 2, 33–66.
- McMahan, E. (1976). Nonverbal communication as a function of attribution in impression formation. *Communication Monographs*, 43, 287–294.
- Mehrabian, D. (1972). *Nonverbal communication*. Chicago: Aldine-Atherton.
- Memon, A., & Vartoukian, R. (1996). The effects of repeated questioning on young children's eyewitness testimony. *British Journal of Psychology*, 87, 403–415.
- Nathanson, R., & Saywitz, K. J. (2003). The effects of the courtroom context on children's memory and anxiety. *Journal of Psychiatry and Law*, 31, 67–98.
- Neil, S. R. (1989). The effects of facial expression and posture on children's reported responses to teacher nonverbal communication. *British Educational Research Journal*, 15, 195–204.
- Orbach, Y., & Lamb, M. E. (2000). Enhancing children's narratives in investigative interviews. *Child Abuse and Neglect*, 24, 1631–1648.
- Otta, E., Abrosio, F., & Hoshino, R. (1996). Reading a smiling face: Messages conveyed by various forms of smiling. *Perceptual and Motor Skills*, 82, 1111–1120.
- Perry, N., & Wrightsman, L. (1991). *The child witness: Legal issues and dilemmas*. London: Sage.
- Poole, D. A., & Lamb, M. E. (1998). *Investigative interviews of children: A guide for helping professionals*. Washington, DC: American Psychological Association.
- Quas, J. A., & Lench, H. C. (2006). Arousal at encoding, arousal at retrieval, interviewer support, and children's memory for a mild stressor. *Applied Cognitive Psychology*, 19, 1–17.
- Quas, J. A., Qin, J., Schaaf, J. M., & Goodman, G. S. (1997). Individual differences in children's and adults' suggestibility and false event memory. *Learning and Individual Differences*, 9, 359–370.
- Reece, M., & Whitman, R. (1962). Expressive movements, warmth, and verbal reinforcement. *Journal of Abnormal and Social Psychology*, 64, 234–236.
- Roberts, K. P., Lamb, M. E., & Sternberg, K. J. (2004). The effects of rapport-building style on children's reports of a staged event. *Applied Cognitive Psychology*, 18, 189–202.

- Rockwell, P., & Hubbard, A. E. (1999). The effect of attorneys' nonverbal communication on perceived credibility. *Journal of Credibility Assessment and Witness Psychology*, 2(1), 1–13.
- Roebbers, C. M., & Schneider, W. (2000). The impact of misleading questions on eyewitness memory in children and adults. *Applied Cognitive Psychology*, 14, 509–526.
- Roebbers, C., Schwarz, S., & Neumann, R. (2005). Social influence and children's event recall and suggestibility. *European Journal of Developmental Psychology*, 2(1), 47–69.
- Rotenberg, K. J., Eisenberg, N., Cumming, C., Smith, A., Singh, M., & Terlicher, E. (2003). The effects of adults' nonverbal cues and children's shyness on the development of rapport between adults and preschool children. *International Journal of Behavioural Development*, 27, 21–30.
- Saywitz, K. J., Goodman, G. S., Nicholas, E., & Moan, S. (1991). Children's memories of physical examinations involving genital touch: Implications for reports of child sexual abuse. *Journal of Consulting Psychology*, 59, 682–691.
- Schreiber, N., Bellah, L. D., Martinez, Y., McLaurin, K. A., Strok, R., Garven, S., et al. (2006). Suggestive interviewing in the McMartin Preschool and Kelly Michaels daycare abuse cases: A case study. *Social Influence*, 1, 16–47.
- Schreiber, N., & Parker, J.F. (in press). Inviting witnesses to speculate: Effects of age and interaction on children's recall. *Journal of Experimental Child Psychology*.
- Sondhi, V., & Gupta, A. (2005). The role of interviewers' behavior in eyewitness suggestibility. *Journal of Credibility Assessment and Witness Psychology*, 6(1), 1–19.
- Thomas, S. L., Skitka, L. J., Christen, S., & Jurgena, M. (2002). Social facilitation and impression formation. *Basic and Applied Social Psychology*, 24, 67–70.
- Thompson, W. C., Clarke-Stewart, K. A., & Lepore, S. J. (1997). What did the janitor do? Suggestive interviewing and the accuracy of children's accounts. *Law and Human Behavior*, 21(4), 405–426.
- Tickle-Degnen, L., & Rosenthal, R. (1990). The nature of rapport and its nonverbal correlates. *Psychological Inquiry*, 1, 285–293.
- Tobey, A., & Goodman, G. S. (1992). Children's eyewitness memory: Effect of participation and forensic context. *Child Abuse and Neglect*, 16, 807–821.
- Waterman, A., Blades, M., & Spencer, C. (2004). Indicating when you do not know the answer: The effect of question format and interviewer knowledge on children's don't know responses. *British Journal of Developmental Psychology*, 22, 335–348.
- Wright, D. B., & Stroud, J. N. (1998). Memory quality and misinformation for peripheral and central objects. *Legal and Criminological Psychology*, 3, 273–286.

Appendix G

Correlations between children's perception ratings for the eight clips separately for
studies 1 (p. 73) and 3 (p. 100)

Study 1, page 73. *Correlations matrix for the six perception measures on the non-verbal behaviours for the eight different clips separately.*

	Friendly	Helpful	Sincere	Strict	Bored	Stressed
<i>Clip 1: Smiling - Open body posture – No fidgeting</i>						
Friendly	~	.48 ***	.71 ***	-.06 n.s.	-.12 n.s.	-.22 n.s.
Helpful		~	.26 n.s.	-.45 ***	-.20 n.s.	-.36 *
Sincere			~	-.06 n.s.	-.09 n.s.	-.02 n.s.
Strict				~	.31 n.s.	.29 n.s.
Bored					~	.47 ***
Stressed						~
<i>Clip 2: Smiling - Open body posture – Fidgeting</i>						
Friendly	~	.51 ***	.15 n.s.	-.35 *	-.46 ***	-.26 n.s.
Helpful		~	.21 n.s.	-.18 n.s.	-.28 n.s.	-.25 n.s.
Sincere			~	.12 n.s.	-.27 n.s.	-.35 *
Strict				~	.30 *	-.06 n.s.
Bored					~	.38 *
Stressed						~
<i>Clip 3: Smiling - Closed body posture - Not fidgeting</i>						
Friendly	~	.29 n.s.	.56 ***	-.28 n.s.	-.17 n.s.	-.20 n.s.
Helpful		~	.38 *	-.08 n.s.	-.23 n.s.	-.40 *
Sincere			~	-.15 n.s.	-.37 *	-.35 *
Strict				~	.27 n.s.	.24 n.s.
Bored					~	.66 ***
Stressed						~
<i>Clip 4: Smiling - Closed body posture - Fidgeting</i>						
Friendly	~	.52 ***	.41 ***	.00 n.s.	-.39 *	-.50 ***
Helpful		~	.48 ***	.23 n.s.	-.46 ***	-.22 n.s.
Sincere			~	.10 n.s.	-.17 n.s.	-.33 *
Strict				~	.08 n.s.	.19 n.s.
Bored					~	.31 *
Stressed						~

<i>Clip 5: Not smiling - Open body posture - Not fidgeting</i>						
Friendly	~	.38 *	.36 *	-.33 n.s.	-.07 n.s.	-.54 ***
Helpful		~	.48 ***	-.09 n.s.	-.38 *	-.46 *
Sincere			~	-.34 n.s.	-.05 n.s.	-.48 ***
Strict				~	.25 n.s.	.28 n.s.
Bored					~	.26 n.s.
Stressed						~
<i>Clip 6: Not smiling - Open body posture - Fidgeting</i>						
Friendly	~	.55 ***	.38 ***	-.32 *	-.31 *	-.14 n.s.
Helpful		~	.51 ***	-.01 n.s.	-.08 n.s.	-.16 n.s.
Sincere			~	.03 n.s.	.09 n.s.	-.13 n.s.
Strict				~	.19 n.s.	.25 n.s.
Bored					~	.33 *
Stressed						~
<i>Clip 7: Not smiling - Closed body posture - Not fidgeting</i>						
Friendly	~	.73 ***	.37 *	-.15 n.s.	-.46 ***	-.15 n.s.
Helpful		~	.13 n.s.	-.15 n.s.	-.34 *	-.18 n.s.
Sincere			~	.14 n.s.	-.17 n.s.	-.11 n.s.
Strict				~	.47 ***	.41 ***
Bored					~	.45 ***
Stressed						~
<i>Clip 8: Not smiling - Closed body posture - Fidgeting</i>						
Friendly	~	.45 ***	.44 ***	-.06 n.s.	-.21 n.s.	-.22 n.s.
Helpful		~	.46 ***	.27 n.s.	-.28 n.s.	-.26 n.s.
Sincere			~	.23 n.s.	-.30 *	-.31 *
Strict				~	-.13 n.s.	.01 n.s.
Bored					~	.26 n.s.
Stressed						~

Key: * denotes $p < .05$; *** denotes $p < .01$; n.s. denotes 'not significant'.

Study 3, page 100. *Correlations matrix for the six perception measures on the verbal behaviours for the eight different clips separately.*

	Friendly	Helpful	Sincere	Strict	Bored	Stressed
<i>Clip 1 : Neutral coercion - Positive reinforcement - Positive filler</i>						
Friendly	~	.23 n.s.	.26 n.s.	-.52 ***	-.14 n.s.	-.20 n.s.
Helpful		~	.39 ***	-.20 n.s.	-.21 n.s.	-.09 n.s.
Sincere			~	-.14 n.s.	-.13 n.s.	-.30 *
Strict				~	.01 n.s.	.15 n.s.
Bored					~	.37 *
Stressed						~
<i>Clip 2: Neutral coercion - Positive reinforcement - Negative filler</i>						
Friendly	~	.72 ***	.47 ***	-.21 n.s.	-.16 n.s.	-.53 ***
Helpful		~	.56 ***	-.27 n.s.	-.29 n.s.	-.46 ***
Sincere			~	-.10 n.s.	-.32 *	-.37 *
Strict				~	.28 n.s.	.19 n.s.
Bored					~	.11 n.s.
Stressed						~
<i>Clip 3: Neutral coercion - Negative reinforcement - Positive filler</i>						
Friendly	~	.47 ***	.27 n.s.	-.15 n.s.	-.28 n.s.	-.12 n.s.
Helpful		~	.41 ***	.05 n.s.	-.47 ***	-.16 n.s.
Sincere			~	.12 n.s.	-.40 ***	-.36 *
Strict				~	-.08 n.s.	.11 n.s.
Bored					~	.01 n.s.
Stressed						~
<i>Clip 4: Neutral coercion - Negative reinforcement - Negative filler</i>						
Friendly	~	.52 ***	.38 *	.05 n.s.	-.10 n.s.	-.44 ***
Helpful		~	.69 ***	.25 n.s.	-.30 *	-.40 ***
Sincere			~	.31 *	-.24 n.s.	-.24 n.s.
Strict				~	.23 n.s.	-.02 n.s.
Bored					~	-.11 n.s.
Stressed						~

<i>Clip 5: Negative coercion - Positive reinforcement - Positive filler</i>						
Friendly	~	.64 ***	.23 n.s.	-.14 n.s.	-.29 *	-.19 n.s.
Helpful		~	.11 n.s.	-.22 n.s.	-.23 n.s.	-.13 n.s.
Sincere			~	-.05 n.s.	-.10 n.s.	.11 n.s.
Strict				~	-.13 n.s.	.09 n.s.
Bored					~	-.18 n.s.
Stressed						~
<i>Clip 6: Negative coercion - Positive reinforcement - Negative filler</i>						
Friendly	~	.73 ***	.35 *	-.36 *	-.12 n.s.	-.50 ***
Helpful		~	.50 ***	-.45 ***	-.23 n.s.	-.64 ***
Sincere			~	-.15 n.s.	-.31 *	-.43 ***
Strict				~	.45 ***	.27 n.s.
Bored					~	.05 n.s.
Stressed						~
<i>Clip 7: Negative coercion - Negative reinforcement - Positive filler</i>						
Friendly	~	.68 ***	.59 ***	-.14 n.s.	-.32 *	-.33 *
Helpful		~	.47 ***	-.01 n.s.	-.31 *	-.48 ***
Sincere			~	.01 n.s.	-.15 n.s.	-.54 ***
Strict				~	.02 n.s.	.01 n.s.
Bored					~	.01 n.s.
Stressed						~
<i>Clip 8: Negative coercion - Negative reinforcement - Negative filler</i>						
Friendly	~	.18 n.s.	.01 n.s.	.18 n.s.	.11 n.s.	.22 n.s.
Helpful		~	.29 n.s.	-.06 n.s.	.04 n.s.	-.18 n.s.
Sincere			~	.08 n.s.	.01 n.s.	-.02 n.s.
Strict				~	-.13 n.s.	.13 n.s.
Bored					~	.01 n.s.
Stressed						~

Key: * denotes $p < .05$; *** denotes $p < .01$; n.s. denotes 'not significant'.